Vol. 1108 Number 3

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

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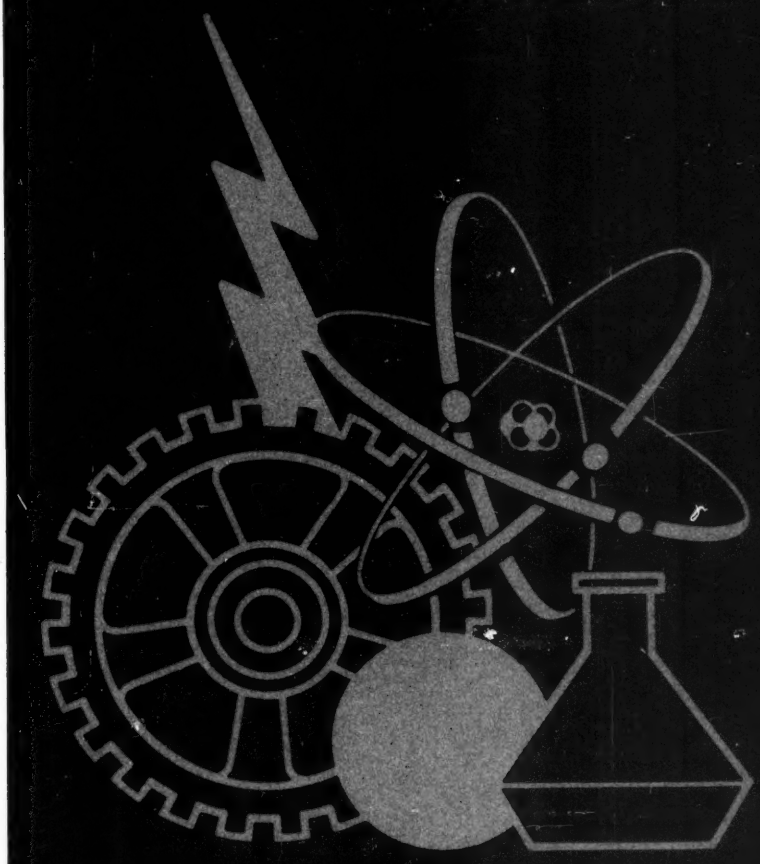
PATENTS

NOVEMBER 21, 1989



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OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE

November 21, 1989 Volume 1108 Number 3

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

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PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1107 O.G. 5 on Oct. 3, 1989.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 5 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of Sept. 1, 1989, and was announced in the *Official Gazette* at 1105 O.G. 36 on Aug. 15, 1989.

International PCT fees were changed on June 1, 1989 due to a difference in the exchange rate of the U.S. dollar in relaton to the Swiss Franc and were announced in the *Official Gazette* at 1102 O.G. 90 on May 30, 1989.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1040.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA.	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	436.00
Basic Supplemental fee (for each page over 30)	9.00
Designation fee per country or region for the first 10 national or regional offices	106.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	134.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1	30.00	30.00

Sept. 12, 1989. DONALD J. QUIGG,
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on November 18, 1986, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,622,696 through 4,624,014
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on November 16, 1982 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,358,859 through 4,359,782
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

" (e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force

beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$245.00
By other than a small entity.....$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$495.00
By other than a small enttity.....$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982.....$120.00

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED SEPTEMBER 3, 1989
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,538,302	06/659,180	09/03/85
4,538,310	06/472,598	09/03/85
4,538,317	06/477,250	09/03/85
4,538,325	06/492,595	09/03/85
4,538,327	06/475,108	09/03/85
4,538,333	06/434,373	09/03/85
4,538,354	06/531,672	09/03/85
4,538,356	06/676,316	09/03/85
4,538,359	06/618,098	09/03/85
4,538,363	06/608,431	09/03/85
4,538,375	06/543,494	09/03/85
4,538,376	06/577,053	09/03/85
4,538,383	06/448,070	09/03/85
4,538,393	06/444,531	09/03/85
4,538,399	06/624,170	09/03/85
4,538,400	06/619,715	09/03/85
4,538,409	06/536,272	09/03/85
4,538,410	06/608,369	09/03/85
4,538,415	06/591,673	09/03/85
4,538,424	06/580,493	09/03/85
4,538,426	06/531,348	09/03/85
4,538,428	06/595,963	09/03/85
4,538,430	06/604,234	09/03/85
4,538,434	06/587,495	09/03/85
4,538,435	06/493,935	09/03/85
4,538,438	06/626,928	09/03/85
4,538,439	06/483,652	09/03/85
4,538,443	06/568,134	09/03/85
4,538,456	06/486,762	09/03/85
4,538,459	06/516,656	09/03/85
4,538,462	06/560,639	09/03/85
4,538,463	06/589,971	06/03/85
4,538,464	06/539,013	09/03/85
4,538,470	06/487,738	09/03/85
4,538,473	06/447,866	09/03/85
4,538,475	06/524,322	09/03/85
4,538,476	06/493,823	09/03/85
4,538,479	06/321,629	09/03/85
4,538,484	06/493,516	09/03/85
4,538,485	06/593,087	09/03/85
4,538,490	06/490,693	09/03/85
4,538,493	06/532,531	09/03/85
4,538,497	06/446,184	09/03/85
4,538,501	06/366,273	09/03/85
4,538,508	06/575,827	09/03/85
4,538,526	06/479,642	09/03/85
4,538,534	06/608,361	09/03/85
4,538,539	06/591,504	09/03/85
4,538,564	06/515,055	09/03/85
4,538,567	06/640,133	09/03/85
4,538,572	06/530,694	09/03/85
4,538,588	06/559,194	09/03/85
4,538,589	06/632,055	09/03/85
4,538,595	06/582,081	09/03/85
4,538,598	06/418,848	09/03/85
4.538,601	06/543,836	09/03/85
4,538,614	06/513,012	09/03/85
4,538,616	06/517,065	09/03/85
4,538,618	06/582,758	09/03/85
4,538,619	06/549,889	09/03/85
4,538,621	06/460,769	09/03/85
4,538,626	06/483,371	09/03/85
4,538,629	06/510,406	09/03/85
4,538,635	06/539,352	09/03/85
4,538,637	06/470,098	09/03/85
4,538,646	06/593,231	09/03/85
4,538,660	06/524,509	09/03/85
4,538,683	06/590,615	09/03/85
4,538,696	06/518,619	09/03/85
4,538,716	06/410,845	09/03/85
4,538,718	06/394,830	09/03/85
4,538,721	06/453,861	09/03/85
4,538,736	06/512,965	09/03/85
4,538,737	06/499,858	09/03/85
4,538,743	06/665,755	09/03/85
4,538,746	06/508,930	09/03/85
4,538,747	06/573,749	09/03/85
4,538,751	06/520,708	09/03/85
4,538,757	06/518,989	09/03/85
4,538,759	06/695,741	09/03/85
4,538,761	06/472,099	09/03/85
4,538,764	06/510,089	09/03/85
4,538,765	06/447,311	09/03/85
4,538,766	06/500,848	09/03/85
4,538,769	06/502,006	09/03/85
4,538,775	06/414,538	09/03/85
4,538,777	06/497,660	09/03/85
4,538,783	06/495,344	09/03/85

Patent Number	Serial Number	Issue Date
4,538,784	06/407,491	09/03/85
4,538,786	06/548,147	09/03/85
4,538,788	06/596,857	09/03/85
4,538,792	06/512,062	09/03/85
4,538,794	06/479,261	09/03/85
4,538,796	06/652,159	09/03/85
4,538,797	06/511,836	09/03/85
4,538,802	06/273,331	09/03/85
4,538,803	06/579,208	09/03/85
4,538,804	06/469,853	09/03/85
4,538,809	06/557,616	09/03/85
4,538,815	06/603,728	09/03/85
4,538,823	06/621,849	09/03/85
4,538,826	06/620,609	09/03/85
4,538,827	06/601,071	09/03/85
4,538,842	06/530,793	09/03/85
4,538,848	06/551,721	09/03/85
4,538,850	06/473,102	09/03/85
4,538,855	06/504,842	09/03/85
4,538,859	06/402,095	09/03/85
4,538,861	06/562,857	09/03/85
4,538,865	06/575,762	09/03/85
4,538,876	06/477,851	09/03/85
4,538,887	06/587,618	09/03/85
4,538,917	06/690,376	09/03/85
4,538,926	06,467,323	09/03/85
4,538,927	06/570,207	09/03/85
4,538,932	06/623,683	09/03/85
4,538,934	06/520,634	09/03/85
4,538,939	06/581,453	09/03/85
4,538,942	06,620,354	09/03/85
4,538,947	06/554,992	09/03/85
4,538,965	06/655,879	09/03/85
4,538,967	06/486,510	09/03/85
4,538,970	06/542,849	09/03/85
4,538,979	06/587,880	09/03/85
4,538,981	06/311,116	09/03/85
4,538,992	06/611,253	09/03/85
4,538,995	06/621,114	09/03/85
4,538,996	06/464,851	09/03/85
4,539,007	06/492,821	09/03/85
4,539,009	06/667,525	09/03/85
4,539,010	06/566,874	09/03/85
4,539,013	06/309,535	09/03/85
4,539,019	06/612,821	09/03/85
4,539,026	06/568,898	09/03/85
4,539,035	06/593,540	09/03/85
4,539,038	06/488,247	09/03/85
4,539,055	06/589,819	09/03/85
4,539,057	06/589,725	09/03/85
4,539,069	06/562,825	09/03/85
4,539,077	06/487,091	09/03/85
4,539,078	06/663,639	09/03/85
4,539,090	06/604,970	09/03/85
4,539,100	06/552,865	09/03/85
4,539,119	06/517,434	09/03/85
4,539,122	06/581,932	09/03/85
4,539,124	06/578,828	09/03/85
4,539,127	06/345,505	09/03/85
4,539,128	06/399,711	09/03/85
4,539,142	06/604,230	09/03/85
4,539,146	06/639,749	09/03/85
4,539,147	06/447,715	09/03/85
4,539,150	06/625,656	09/03/85
4,539,151	06/625,815	09/03/85
4,539,167	06/482,161	09/03/85
4,539,201	06/546,600	09/03/85
4,539,202	06/478,326	09/03/85
4,539,209	06/679,386	09/03/85
4,539,213	06/613,237	09/03/85
4,539,221	06/607,602	09/03/85
4,539,235	06/673,188	09/03/85
4,539,236	06/574,017	09/03/85
4,539,292	06/454,219	09/03/85
4,539,310	06/615,337	09/03/85
4,539,314	06/616,371	09/03/85
4,539,315	06/547,130	09/03/85
4,539,319	06/504,257	09/03/85
4,539,323	06/531,842	09/03/85
4,539,326	06/510,723	09/03/85
4,539,328	06/478,959	09/03/85
4,539,330	06/664,926	09/03/85
4,539,337	06/592,603	09/03/85
4,539,368	06/634,539	09/03/85
4,539,425	06/564,198	09/03/85
4,539,427	06/543,092	09/03/85
4,539,430	06/611,558	09/03/85
4,539,432	06/573,520	09/03/85
4,539,440	06/495,054	09/03/85
4,539,442	06/562,876	09/03/85
4,539,449	06/396,383	09/03/85
4,539,454	06/652,897	09/03/85
4,539,455	06/484,851	09/03/85
4,539,457	06/558,774	09/03/85
4,539,468	06/475,825	09/03/85
4,539,471	06/605,131	09/03/85
4,539,477	06/499,484	09/03/85
4,539,481	06/435,690	09/03/85
4,539,508	06/441,186	09/03/85
4,539,519	06/371,203	09/03/85
4,539,540	06/495,648	09/03/85
4,539,545	06/614,457	09/03/85
4,539,557	06/434,705	09/03/85
4,539,561	06/464,049	09/03/85
4,539,562	06/454,716	09/03/85
4,539,564	06/405,301	09/03/85
4,539,567	06/531,260	09/03/85
4,539,568	06/660,539	09/03/85
4,539,590	06/473,225	09/03/85
4,539,595	06/509,583	09/03/85
4,539,599	06/386,718	09/03/85
4,539,609	06/402,827	09/03/85
4,539,611	06/422,645	09/03/85
4,539,612	06/427,598	09/03/85
4,539,614	06/495,801	09/03/85
4,539,620	06/580,213	09/03/85
4,539,629	06/579,207	09/03/85
4,539,630	06/466,539	09/03/85
4,539,631	06/627,101	09/03/85
4,539,643	06/420,951	09/03/85
4,539,662	06/384,243	09/03/85
4,539,669	06/458,590	09/03/85
4,539,693	06/488,574	09/03/85
4,539,700	06/596,570	09/03/85
4,539,701	06/448,848	09/03/85

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

4,248,940, Re. S. N. 419,358, Filed Oct. 10, 1989, Cl. 428/633, THERMAL BARRIER COATING FOR NICKEL AND COBALT BASE SUPER ALLOYS, George W. Goward, et al., Owner of Record: *United Technologies Corp., East Hartford, Conn.*, Attorney or Agent: James M. Rashid, Ex. Gp.:111

4,299,012, Re. S. N. 417,241, Filed Oct. 4, 1989, Cl. 24/19, HOSE CLAMP, Hans Oetike, Owner of Record: *Inventor*, Attorney or Agent: Paul M. Craig, Ex. Gp.: 357

4,315,348,Re. S. N. 417,047, Filed Oct. 4, 1989, Cl. 24/20, MECHANICAL LOCK FOR CLAMPS, Hans Oetiker, Owner of Record: *Minnesota Mining and Manufacturing Company, St. Paul, Minn.*, Attorney or Agent: Paul M. Craig Jr., Ex. Gp.: 357

4,492,004, Re. S. N. 471,046, Filed Oct. 4, 1989, Cl. 24/20, ENDLESS CLAMP STRUCTURE, Hans Oetiker, Owner of Record: *Inventor*, Attorney or Agent: Paul M. Craig Jr., Ex. Gp.: 357

4,698,553, Re. S. N. 408,225, Filed Sept. 15, 1989, Cl. 315/200, ELECTRIC POWER SUPPLY, Ole K. Nilssen, Owner of Record: *Inventor,* Attorney or Agent: None, Ex. Gp.: 252

4,699,470, Re. S. N. 420,559, Filed Oct. 12, 1989, Cl. 350/334, NACP LIQUID CRYSTAL APPARATUS INCORPORATING A CONTROL, Charles W. McLaughlin, et al., Owner of Record: *Taliq Corp., Mountain View, Calif.,* Attorney or Agent: William J. Egan III, Ex. Gp.: 254

4,703,387, Re. S. N. 419,507, Filed Oct. 10, 1989, Cl. 361/79, ELECTRIC MOTOR UNDERLOAD PROECTION SYSTEM, Thomas A. Miller, Owner of Record: *Franklin Electric Co. Inc., Bluffton, Ind.,* Attorney of Agent: Donald J. Brott, Ex. Gp.: 214

4,730,143, Re. S. N. 421,909, Filed Oct. 16, 1989, Cl. 313/407, IMPROVED COLOR CATHODE RAY TUBE HAVING A FACEPLATE-MOUNTED SUPPORT STRUCTURE WITH A WELDED-ON HIGH-TENSION FOIL SHADOW MASK, James R. Fendley, Owner of Record: *Zenith Electronics Corp., Glenview, Ill.,* Attorney or Agent: John H. Coult, Ex. Gp.: 264

4,776,453, Re. S. N. 419,520, Filed Oct. 10, 1989, Cl. 198/803.2, ACCUMULATING CONVEYOR, Jack E. Miller, Owner of Record: *Harry Major Machine and Tool Co., Fraser, Mich.,* Attorney or Agent: Andrew R. Basile, Ex. Gp.: 317

4,781,993, Re. S. N. 419,600, Filed Oct. 10, 1989, Cl. 426/242, INFRARED DEHYDRATOR UNIT FOR MINCED FISH, Joseph Fraioli, Owner of Record: *Inventor,* Attorney or Agent: Michael Ebert, Ex. Gp.: 132

4,824,049, Re. S. N. 419,232, Filed Oct. 6, 1989, Cl. 248/176, CUSHIONING DEVICE FOR REMOTE CONTROL TELEVISION EQUIPMENT, AND ASSEMBLY THEREOF, Les I. Butler, Owner of Record: *Bill Butler, Lynne Butler, Stephen W. Butler, North Hollywood, Calif.,* Attorney or Agent: John J. Posta, Ex. Gp.: 355

4,824,409, Re. S. N. 419,937, Filed Oct. 11, 1989, Cl. 440/47, MARINE VESSEL WITH INTERNAL COMBUSTION ENGINE HAVING AN EXHAUST PIPE, Noboru Kobayashi, Owner of Record: *Inventor,* Attorney or Agent: Frank J. Jordan, Ex. Gp.: 315

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

4,083,229, Reexam. No. 90/001,865, Requested Oct. 13, 1989, Cl. 73/40.005, METHOD AND APPARATUS FOR DETECTING AND LOCATING FLUID LEAKS, Allen R. Anway, Owner of Record: *Plaunt & Anderson Co., Duluth, Minn.,* Attorney or Agent: Nies, Webner, Kurtz & Bergert, Ex. Gp.: 260, Requester: Claude A. S. Hamrick, San Jose, Calif.

4,471,385, Reexam. No. 90/001,867, Requested Oct. 19, 1989, Cl. 358/230, ELECTRO-OPTICAL ILLUMINATION CONTROL SYSTEM, Gilbert P. Hyatt, Owner of Record: *Inventor, Anaheim, Calif.,* Attorney or Agent: None, Ex. Gp.: 260, Requester: Hoffman, Wasson, Fallow & Gitler, Arlington, Va.

4,680,224, Reexam. No. 90/001,868, Requested Oct. 23, 1989, Cl. 428/294, REINFORCED PLASTIC, James E. Connor, Owner of Record: *Phillips Petroleum Co., Bartlesville, Okla.,* Attorney or Agent: Unknown, Ex. Gp.: 150, Requester: Oblon, Spivak, McClelland, et al., Arlington, Va.

4,800,876, Reexam. No. 90/001,866, Requested Oct. 16, 1989, Cl. 128/303.100, METHOD OF AND APPARATUS FOR LASER TREATMENT OF BODY LUMENS, Kenneth R. Fox, et al., Owner of Record: *Kenneth R. Fox, et al., Arlington Va.,* Attorney or Agent: Wigman & Cohen, Ex. Gp.: 330, Requester: Wolf, Greenfield & Sacks, Boston, Mass.

Service by Publication

A petition to cancel the registration identified below having been filed, and the notice of such proceeeding sent by certified mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, its assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Faberge USA, Inc., New York, N.Y., Reg. No. 695,808, for the mark "Degas Mauve", Canc. No. 17,960.

ERMA S. BROWN
Administrator of the Trademark Trial and Appeal Board
For JEFFREY M. SAMUELS
Assistant Commissioner for Trademarks

Adverse Decisions in Interference

In the designated interferences involving the following patents, final decisions have been rendered that the respective patentees were not the first inventors with respect to the claims listed.

Patent No. 4,256,104, Andrew John Muetterties, Joseph Nicholas Genese, EQUIPMENT SETS AND SYSTEM FOR THE SEQUENTIAL ADMINISTRATION OF MEDICAL LIQUIDS AT DUAL FLOW RATES, Inteference No. 101,078, decided Jan. 8, 1986, claims 1, 2, 5, 7, 8, 11, 12, 13/11, 13/12, 14/12, 16, 17 and 24.

Patent No. 4,256,104, Andrew John Muetterties, Joseph Nicholas Genese, EQUIPMENT SETS AND SYSTEM FOR THE SEQUENTIAL ADMINISTRATION OF MEDICAL LIQUIDS AT DUAL FLOW RATES, Inteference No. 100,817, decided Jan. 8, 1986, claims 3, 4 and 6.

Patent No. 4,325,366, Carl J. Tabor, VALVE AND METHOD FOR USE WITH A TRACHEOTOMY TUBE, Interference No. 101,290, decided Sept. 17, 1987, claims 3-6 and 9-14.

Patent No. 4,341,441, Paul Elliott Lighty, Philip William Black, John Irven, METHOD OF MAKING SOLID PREFORMS AND OPTICAL FIBERS DRAWN THEREFROM, Interference No. 101,316, decided July 1, 1987, claims 1, 3, 6-26.

NANNIE B. HENRY
Deputy Clerk, Board of Patent Appeals and Interferences

Adverse Decisions in Interference

In the designated interferences involving the following patents, final decisions have been rendered that the respective patentees are not entitled to patents containing the claims listed.

Patent No. 4,339,568, Louis M. Maresca, AROMATIC POLYMERS CONTAINING KETONE GROUPS, Interference No. 101,968, decided Aug. 8, 1989, claims 1-4.

Patent No. 4,339,453, Howard M. Berg, Gary L. Lewis, Curtis

W. Mitchell, LOW THERMAL IMPEDANCE PLASTIC PACKAGE, Interference No. 102,088, decided Sept. 12, 1989, claims 1-7.

Patent No. 4,565,568, Howard Johnston, Lillian H. Troxell, PYRIDYL(OXY/THIO)PHENOXY COMPOUNDS, HERBICIDAL COMPOSITIONS AND METHODS, Interference No. 101,961, decided Oct. 11, 1989, claims 1-12.

Patent No. 4,572,253, M. Zane Farmer, Diane B. Farmer, AUTOMATIC LEVEL SENSING SYSTEM, Interference No. 102,128, decided Aug. 24, 1989, claims 25, 28-30.

Patent No. 4,572,253, M. Zane Farmer, Diane B. Farmer, AUTOMATIC LEVEL SENSING SYSTEM, Interference No. 102,129, decided Aug. 24, 1989, claims 1-12, 15-20, and 23.

Patent No. 4,598,086, Dennis Bigg, Jacques Menin, ALPHA$_2$ ANTAGONISTIC 2-(4,5-DIHYDRO-2-1H-IMIDAZOLYL)-2,3-DIHYDRO-1H-INDOLES, Interference No. 101,846, decided Aug. 31, 1989, claims 1 and 2.

Patent No. 4,598,086, Dennis Bigg, Jacques Menin, ALPHA$_2$ ANTAGONISTIC 2-(4,5-DIHYDRO-2-1H-IMIDAZOLYL)-2,3-DIHYDRO-1H-INDOLES, Interference No. 101,870, decided Aug 31, 1989, claims 1 and 2.

Patent No. 4,609,043, Alvin S. Cullick, ENHANCED OIL RECOVERY USING CARBON DIOXIDE, Interference No. 101,920, decided Sept. 22, 1989, claims 1-13.

Patent No. 4,617,608, Greg E. Blonder, Angelo A. Lamola, Robert A. Lieberman, VARIABLE GAP DEVICE AND METHOD OF MANUFACTURE, Interference No. 102,022, decided Oct. 19, 1989, claims 15-18.

Patent No. 4,618,616, Kenneth Richardson, Robert J. Bass, Kelvin Cooper, CYCLOPROPYLIDENE ANTIFUNGAL AGENTS, Interference No. 102,043, decided Sept. 28, 1989, claim 10.

Patent No. 4,631,422, Douglas S. Piasecki, TTL CIRCUIT WITH A CLAMPING TRANSISTOR FOR SPEEDY TURN-OFF OF OUTPUT TRANSISTOR, Interference No. 102,069, decided Aug, 23, 1989, claims 1-8.

Patent No. 4,659,731, Denis Bigg, Jacques Menin, 2-(4,5-DIHYDRO-1H-IMIDAZOL-2-YL)-2,3-DIHYDROINDOLE DERIVATIVES AND THEIR APPLICATION AS α_2 RECEPTOR ANTAGONIST OR α_1 RECEPTOR AGONISTS, Interference No. 101,836, decided Mar. 3, 1989, claims 1-9, 12, 13 and 15.

Patent No. 4,659,731, Denis Bigg, Jacques Menin, 2-(4, 5-DIHYDRO-1H-IMIDAZOL-2-YL)-2, 3-DIHYDROINDOLE DERIVATIVES AND THEIR APPLICATION AS α_2 RECEPTOR ANTAGONIST OR α_1 RECEPTOR AGONISTS, Interference No. 101,847, decided Aug. 31, 1989, claims 1-9, 12, 13 and 15.

Patent No. 4,696,582, Donald A. Kasten, THREE MEMBER DRAWER SLIDE WITH SEQUENTIAL MOVEMENT, Interference No. 102,020, decided Aug. 9, 1989, claims 1-15.

Patent No. 4,726,835, Masatoshi Uemura, Masashi Sakamoto, Nobuyuki Kikkawa, HERBICIDAL AND PLANT GROWTH REGULATING IMIDAZOLINE DERIVATIVES, Interference No. 102,173, decided Sept. 21, 1989, claims 1-16.

NANNIE B. HENRY
Deputy Clerk
Board of Patent Appeals and Interferences

Extension of Time for Filing Notices of Opposition to Marks Published in the Official Gazette Dated October 17,1989

Copies of the Trademark Official Gazette dated October 17, 1989, were not mailed until October 24, 1989. Therefore, for marks published in the Trademark Official Gazette dated October 17, 1989, Notices of Opposition filed by November 24, 1989 will be considered timely.

Oct. 25, 1989

JEFFREY M. SAMUELS
Assistant Commissioner for Trademarks

Errata

The Registrant of Registration No 165,247 listed in the "Index of Registrants" section of the Trademark Official Gazette of July 5, 1988, at TMI 11, was incorrectly identified as "HERSHEY FOOD CORPORATION".

The Registrant's name as corrected is "HERSHEY FOODS CORPORATION".

Oct. 27, 1989

PATRICIA M. DAVIS
Administrator for Trademark Operations

The following registration number was inadvertently renewed in the "Trademark Registrations Renewed" section of the Official Gazette listed below:

TM 219	517,879	Oct. 31, 1989

Consequently, the above-identified registration is not renewed.

Oct. 27, 1989

PATRICIA M. DAVIS
Administrator for Trademark Operations

Examination Guide

The following examination guide concerns the implementation of The Trademark Law Revision Act of 1988, Public Law 100-667, 102 Stat. 3935, and the amended Rules of Practice in Trademark Cases, 37 C.F.R. Part 2, which take effect on November 16, 1989. The guide is to be used in conjuction with Revision 7 to The Trademark Manual of Examining Procedure.

The guide presents a comprehensive statement of the revisions to Office policy and procedure related to the referenced amendments to the Trademark Act and rules. To the extent that the policies stated in the guide conflict with policies set forth in Revision 7, the provisions of the guide are controlling. Those policies set forth in Revision 7 which do not conflict with the guide remain operative.

Oct. 16, 1989

JEFFERY M. SAMUELS
Assistant Commissioner for Trademarks

EXAMINATION GUIDE 3-89

IMPLEMENTATION OF THE TRADEMARK LAW REVISION ACT OF THE 1988 AND THE AMENDED RULES OF PRACTICE IN TRADEMARK CASES

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Preface

On November 16, 1988, the President signed The Trademark Law Revision Act of 1988 into law, Public Law 100-667, 102 Stat. 3935 (the 1988 amendments). The 1988 amendments, which take effect on November 16, 1989, represent the most significant reform in United States trademark law since the enactment of The Trademark Act of 1946, 15 U.S.C. Section 1051 *et seq.* (the Act). The principal purpose of this examination guide is to provide a comprehensive statement of revisions to Office policy and procedure associated with the 1988 amendments.

The Rules of Practice in Trademark Cases, 37 C.F.R. Section 2.1 *et seq.*, have also been revised effective November 16, 1989, principally to incorporate the provisions of the 1988 amendments. The rules were also revised to update Office policy in other respects. These additional revisions bring the rules into conformity with current Office practice in several areas and reflect changes in practice dictated by decisions such as the Trademark Trial and Appeal Board decision in *Crocker National Bank v. Canadian Imperial Bank of Commerce*, 223 USPQ 909 (TTAB 1984). This guide will also set forth these additional revisions to Office policy and procedure reflected in the rules. The revisions discussed here were published in final form on September 11, 1989, with the exception of the revisions to Trademark Rules 2.42 and 2.186, 37 C.F.R. Sections 2.42 and 2.186, which were published in final form on August 22, 1989, in conjunction with other revisions related to proceedings before the Trademark Trial and Appeal Board. All revisions published on both dates take effect on November 16, 1989. References in this guide to the rules relate to the rules as amended on November 16, 1989.

The most significant amendment to the Act is a provision permitting the filing of applications to register marks on the Principal Register based on a bona fide intention to use a mark in commerce, before actual use (intent-to-use applications). The examination guide will discuss the administration of this provision in detail. However, intent to use and other provisions of the 1988 amendments required revisions in policies and procedures affecting virtually all applications and all aspects of processing. Please read the entire guide carefully to become familiar with all of the provisions.

The first major section of the guide presents the requirements, policies and procedures related to intent-to-use applications. The second major section addresses provisions affecting all applications. The next two sections address provisions related to other specific types of applications, and the final section addresses multiple bases and changes in the basis for registration.

The policies set forth in this guide apply to all applications, affidavits and renewals filed on or after November 16, 1989, unless specifically indicated otherwise. The stated policies also apply to any action taken on or after November 16, 1989, with respect to applications filed before that date, unless specifically indicated otherwise. To the extent that the policies and procedures set forth in this examination guide conflict with policies or procedures set forth in the Trademark Manual of Examining Procedure (TMEP) or other statements of Office policy, the provisions of this examination guide are controlling. Note especially the discussion below concerning the application of the rule restricting amendments to the identification of goods and services to pending applications.

JAMES T. WALSH
Administrator for Trademark Policy and Procedure

DAVID E. BUCHER
Director, Trademark Examining Operation

A. INTENT-TO-USE APPLICATIONS

1. General Overview

a. Summary of Application Flow

The 1988 amendments revise Section 1 of the Act to permit filing of an application to register a mark on the Principal Register based on a statement of a bona fide intention to use the mark in commerce. Trademark Act Section 1(b), 15 U.S.C. Section 1051(b). The Act, as amended, further requires that such an applicant use the mark in commerce before issuance of the registration. The Act thus requires that the applicant file either an amendment to allege use or a statement of use before, and as a precondition to, the issuance of the registration. Trademark Act Sections 1(c) and 1(d), 15 U.S.C. Sections 1051(c) and (d).

The principal difference between the amendment to allege use and the statement of use is the time of filing. The amendment to allege use may be filed during initial examination, that is, after filing of the application but before either approval of the mark for publication or the expiration of the response period after issuance of a final action. Trademark Rule 2.76 (a), 37 C.F.R. Section 2.76(a). If the ammendment to allege use is acceptable and the application is otherwise in condition for publication, the mark will be published for opposition. After publication, the application will be processed in the same manner as an application based on use. If the application is not opposed, or if the applicant prevails in all oppositions filed, the application will proceed to registration.

If the applicant does not file an acceptable amendment to allege use during initial examination or if it is withdrawn, and the application is otherwise in condition for publication, the mark will be published for opposition. If the application is not opposed, or if the applicant prevails in all oppositions filed, the Office will issue a notice of allowance under Trademark Act Section 13 (b)(2), 15 U.S.C. Section 1063 (b)(2). The applicant must file a statement of use within six months of the issuance of the notice of allowance or within an extension of time granted for filing of the statement of use. Trademark Act Section 1(d), 15 U.S.C. Section 1051(d). The applicant may not file the statement of use before issuance of the notice of allowance. Trademark Rule 2.88(a), 37 C.F.R. Section 2.88(a). This period after approval for publication and before issuance of the notice of allowance during which the statement of use may not be filed is referred to as the blackout period. The statement of use will be examined as discussed below.

The applicant may request extensions of time for filing the statement of use under Trademark Act Section 1(d), 15 U.S.C. Section 1051(d). The applicant may request one six-month extension without a showing of good cause and four additional six-month extensions with a showing of good cause. Trademark Rule 2.89, 37 C.F.R. Section 2.89. Extensions of time are discussed below in detail (A.7.).

Please note that any reference to "initial examination" refers to examination of an intent-to-use application before approval for publication. The examination after filing of the statement of use will be referred to as "examination of the statement of use." Also, please note that the "notice of allowance" refers to a new document required under the 1988 amendments. To avoid confusion, the term "allowance" will be used only in reference to this document and this phase of processing intent-to- use applications. Therefore, this guide will use the term "approval for publication" rather than "allowance for publication" to avoid any confusion with the notice of allowance.

As discussed in more detail below, the examining attorney must raise and dispose of all possible issues in the application during the initial examination. During examination of the statement of use, the examining attorney may not issue requirements or refusals which could or should have been presented in the initial examination unless the failure to do so initially was a clear error as defined below (A.9.b.).

The Office has established a special intent-to-use unit (ITU Unit) to process certain papers. Paralegals in the ITU Unit will review all statements of use to determine whether they meet the minimum requirements to be forwarded for examination on the merits, in the same way that the Application Section reviews the initial application for compliance with filing requirements. If the statement of use meets the minimum requirements, it will be referred to the examining attorney in the law office for

examination on the merits. The paralegals in the ITU Unit will also review and act on all requests for extensions of time to file statements of use.

b. Constructive Use Priority

Trademark Act Section 7 has also been amended to provide that the filing of *any* application for registration on the Principal Register, including an intent-to-use application, constitutes constructive use of the mark, provided the application matures into a registration. Trademark Act Section 7(c), 15 U.S.C. Section 1057(c). Upon registration, filing thus affords the applicant nationwide priority over others except parties who had used the mark before the applicant's filing date, parties who had filed in the Office before the applicant or parties who are entitled to an earlier priority filing date based on the filing of a foreign application under Trademark Act Section 44(d), 15 U.S.C. Section 1126(d).

The Office will not amend the filing date of any application filed before November 16, 1989, to a date on or after November 16, 1989, for the purpose of affording the applicant whatever benefit the constructive use date may provide.

c. Application Requirements

Intent-to-use applications must comply with all of the requirements of the Act and relevant regulations in all respects except as specifically noted in this guide. For example, the provisions of Sections 2(e)(1), 2(e)(2) and 2(e)(3) apply to intent-to-use applications as well as to other applications. This section of the guide will focus on those requirements, policies and procedures related to intent-to-use applications which differ from those related to the filing and processing of other applications.

d. Applications Not Accepted Until Effective Date

The Office will not accept any intent-to-use applications filed before November 16, 1989. If any such application is received before that date, the Office will return the application. If an intent-to-use application filed before the effective date reaches the examining attorney in error, the examining attorney should return the case to the Application Section for appropriate action. However, if the examining attorney has already issued an action, the examining attorney should issue a new action refusing registration because the application was void as filed.

Intent-to-use applications executed before the effective date, but filed on or after the effective date, will be accepted. However, the examining attorney will determine whether the time between execution and filing is within Office guidelines for all applications. *See* TMEP section 803.04. The applicant may reexecute the declaration verifying its statement of a bona fide intention to use the mark in commerce if the examining attorney determines that the delay between execution and filing was unreasonable.

All intent-to-use and Section 44 applicants must file the application within a reasonable time after execution to ensure the statement of intent is valid at the time of filing. The guidelines governing the reasonableness of the lapse of time are the same as those which apply to use applicants.

e. Good Faith

The Act specifies that an applicant may file an application based on a bona fide intention to use a mark in commerce "...under circumstances showing the good faith of such person." Trademark Act Section 1(b), 15 U.S.C. Section 1051(b). The Office will *not* evaluate the good faith of an applicant in the ex parte examina- tion of applications. The applicant's sworn statement of a bona fide intention to use the mark in commerce will always be sufficient evidence of good faith in the ex parte context. Consideration of issues related to good faith is appropriate in an inter partes proceeding.

2. Filing-Date Requirements

Trademark Rule 2.21, 37 C.F.R. Section 2.21, sets forth the minimum requirements for receiving a filing date for an intent- to- use application as well as other types of applications. These minimum formal requirements do not include all of the requirements which may ultimately apply for registration of the mark, but merely those requirements which must be met to receive a filing date. Please note the discussion below of those requirements for receiving a filing date which apply to all applications, in particular, the requirement that the application include a declaration or verification signed by the applicant to receive a filing date (B.1.).

With specific reference to intent-to-use applications, the application must include the following elements to receive a filing date: the name of the applicant; the name and address to which communications can be directed; a drawing of the mark substantially meeting all of the requirements of Trademark Rule 2.52, 37 C.F.R. Section 2.52; an identification of goods or services; a claim of a bona fide intention to use the mark in commerce; a verification or declaration under Trademark Rule 2.33(b), 37 C.F.R. Section 2.33(b), *signed by the applicant;* and the required filing fee for at least one class of goods or services.

In the case of an intent-to-use application, as in the case of all applications, if the application lacks any of the elements specified as necessary to receive a filing date, the application will be denied a filing date and all papers returned to the applicant with an explanation as to the deficiency. TMEP section 704. If an application which lacks one or more of the elements required for receiving a filing date is referred to the law office for examination in error, the examining attorney should return the case to the Application Section for appropriate handling. If the examining attorney discovers that an element was lacking after taking an action in the case, the examining attorney should issue a refusal on the ground that the application was not eligible to receive a filing date. TMEP section 705.02.

The fee for filing an intent-to-use application is the same as the filing fee for any other application, $175.00 per class.

3. Application Requirements - Initial Examination

In an intent-to-use application, the examining attorney will potentially examine both the application and a statement of use. After receipt of the application, the Office will perform the initial examination of the application to determine whether the mark is eligible for registration, but for the lack of use. If it is found to be eligible, the mark will be approved for publication and published for opposition. If the applicant has not submitted an amendment to allege use before publication, and the application is not opposed or survives all oppositions filed, the Office will issue a notice of allowance. Trademark Act Section 13(b), 15 U.S.C. Section 1063(b); Trademark Rule 2.81, 37 C.F.R. Section 2.81. In such a case, the applicant must submit a statement of use. Trademark Act Section 1(d)(1), 15 U.S.C. Section 1051(d)(1); Trademark Rule 2.88, 37 C.F.R. Section 2.88. If an amendment to allege use is filed and accepted, the application will be processed in the same manner as a use application from that point forward.

This section addresses examination before publication only; a later section will discuss the filing and examination of the statement of use after issuance of the notice of allowance.

The examining attorney must examine and act on all possible issues in the initial examination of the application. The intent-to-use application is subject to the same requirements and examination procedures as all other applications, except as specifically noted.

a. Drawings

The examination of the drawing in initial examination, before submission of any amendment to allege use and specimens, will focus primarily on the form of the drawing and compliance with Trademark Rule 2.52, 37 C.F.R. Section 2.52. The examination of the drawing after submission of an amendment to allege use is discussed below (A.4.d.iv.). As in any other application, the applicant may not amend the mark in a drawing if the amendment constitutes a material alteration of the mark. *In re The Wine Society of America, Inc.*, Serial No. 662,515 (TTAB, April 6, 1989). The applicant may not add or delete matter if the amendment would alter the character of the mark.

Please note the discussion below concerning the requirement in all applications that special-form drawings not exceed four inches by four inches to receive a filing date (B.1.b.).

b. Statutory Averments and the Identification of Goods and Services

The application must include a statement that the applicant has a bona fide intention to use the mark in commerce with respect to specific goods and services as well as the other averments specified in Trademark Act Section 1(b), 15 U.S.C. Section 1051(b). Trademark Rule 2.33(b)(2), 37 C.F.R. Section 2.33(b)(2). If the application does not include the averments, the examining attorney must require a new verification including all necessary averments.

The general requirements related to identification of goods and services discussed below apply to intent-to-use applications as well as to all other applications. Under Trademark Rule 2.71(b), 37 C.F.R. Section 2.71(b), "the identification of goods or services may be amended to clarify or limit the identification, but additions will not be permitted." The policies governing the application of this revised rule are discussed in detail below (B.6.) with examples and merit special attention.

Furthermore, under long-standing Office policy, the identification of goods and services must be specific and definite. Cf. *In re Societe Generale des Eaux Minerales de Vittel S.A.*, 1 USPQ2d 1296 (TTAB 1986), *rev'd on other grounds*, 824 F.2d 957, 3 USPQ2d 1450 (Fed. Cir. 1987).

As noted above, the Office will not examine the applicant's good faith in relation to the identification of goods or services or otherwise. Consideration of this issue is more appropriate in an inter partes proceeding.

In suggesting identifications, examining attorneys should not be overly restrictive. See *In re Sentry Chemical Company*, 230 USPQ 556 (TTAB 1986).

Because applicants may only limit or clarify the goods and services, the examining attorney should provide appropriate cautions to the applicant in requiring amendment to the identification of goods and services. When appropriate, the examining attorney should advise the applicant that goods or services explicitly deleted by amendment may not be reinserted at a later point in prosecution. Examining attorneys should take particular attention in the case of pro se applicants to ensure that they are aware of the restrictions related to amendments to the identification of goods and services.

c. Examination for Use as a Trademark or Service Mark

The Office will *not* examine the issue of use as a trademark or service mark in the initial examination of an intent-to-use application unless the applicant has submitted specimens of use in conjunction with an amendment to allege use under Section 1(c). However, as noted below (A.4.d.), if the applicant withdraws an amendment to allege use, the specimens remain of record, but the examining attorney may not consider or act on any such specimens in relation to the issue of use.

d. Examination under Sections 1, 2(a), 2(b), 2(c) and 2(e)

To the fullest extent possible, the examining attorney will examine the intent-to-use application for registrability under Trademark Act Sections 1, 2(a), 2(b), 2(c) and 2(e), 15 U.S.C. Sections 1051, 1052(a), (b), (c) and (e), according to the same procedures and standards which apply to any other application. The examining attorney should investigate all possible issues regarding registrability under these sections through all available sources. If appropriate, the examining attorney should request that the applicant provide literature or explanation concerning these issues under Trademark Rule 2.61(b), 37 C.F.R. Section 2.61(b). The examining attorney should request such information relevant to the types of goods or services or the trade, in general, or similar general information. The examining attorney should not request information regarding use of the specific mark in relation to the goods or services.

First and foremost, the examining attorney must develop evidence during the initial examination from sources other than the applicant. The examining attorney may not make any inquiry or request any information premised on use of the mark before the applicant files an amendment to allege use. If the applicant submits an amendment to allege use during the initial examination, the examining attorney may then obtain relevant information from the applicant in the same manner as would apply in any application based on use unless the amendment to allege use is withdrawn.

The examining attorney must raise all possible issues under these sections in the initial examination of the application. As discussed more fully below (A.9.), Office policy precludes the issuance of a requirement or refusal during examination of the statement of use if the issue could or should have been treated in the initial examination, unless the failure to do so in initial examination constitutes a clear error. **"Clear error" means an error which, if not corrected, would result in issuance of a registration in violation of the Act.** The meaning and application of this standard are discussed in detail below (A.9.b.).

e. Examination under Section 2(d)

The examining attorney will perform a search and will issue refusals, as appropriate, under Trademark Act Section 2(d), 15 U.S.C. Section 1052(d), in the case of an intent-to-use application. The determination of likelihood of confusion under Section 2(d) in an intent-to-use application does not differ from the determination in any other type of application. The examining attorney should consider questions concerning the scope of the goods and services and related goods and services in determining likelihood of confusion under the standards which have historically governed in applications based on use or based on a foreign application or registration.

For the purpose of determining priority among pending applications, the intent-to-use application will be treated in the same manner as any other application. For purposes of publication for opposition, an intent-to-use application will receive priority over any application which has an effective filing date later than the intent-to-use application.

For the purpose of determining priority between two applications which have the same filing date, the application with the earlier date of execution will be accorded priority for purposes of publication for opposition. Trademark Rule 2.83(b), 37 C.F.R. Section 2.83(b). This would apply whether one or both of the applications are intent-to-use applications.

Also, an intent-to-use application, like any other application, cannot serve as the basis for a formal refusal under Section 2(d) until the application has matured into a registration.

f. Claims of Acquired Distinctiveness under Section 2(f)

An intent-to-use applicant may not assert that a nondistinctive designation has acquired distinctiveness under Trademark Act Section 2(f), 15 U.S.C. Section 1052(f), until the applicant has submitted an amendment to allege use or a statement of use. A claim of acquired distinctiveness, by definition, requires prior use. Section 2(f) is limited by its terms to "a mark used by the applicant." Therefore, the examining attorney should reject any claim of acquired distinctiveness filed before submission of an acceptable amendment to allege use or statement of use. The examining attorney should consider and act on any claim of acquired distinctiveness filed after such time in the same manner and according to the same standards which would apply to any other application.

Please note the discussion below of the revision regarding five-year claims of acquired distinctiveness (B.7.).

g. Intent-to-Use Applications and the Supplemental Register

An intent-to-use applicant may not seek registration on the Supplemental Register until the applicant has submitted either an acceptable amendment to allege use or statement of use. Trademark Rule 2.75(b), 37 C.F.R. Section 2.75(b). Only applications under Trademark Act Section 44, 15 U.S.C. Section 1126, are excepted from the use requirement in seeking registration on the Supplemental Register. Trademark Act Section 44(e), 15 U.S.C. Section 1126(e).

If an applicant submits an application for the Supplemental Register based on intent to use, the Office will reject the application because it was void as filed and will return all papers to the applicant with any fees submitted. If any such application reaches an examining attorney in error, the examining attorney should return the papers to the Application Section for appropriate action.

If an intent-to-use applicant does file an acceptable amendment to allege use or statement of use *and* an acceptable amendment to the Supplemental Register, the Office will change the effective filing date of the application to the date of the filing of the amendment to allege use or the statement of use. Trademark Rule 2.75(b), 37 C.F.R Section 2.75(b). The examining

attorney must ensure that the effective filing date has been changed.

The amendment to allege use or statement of use should be examined before any action is taken on an amendment to the Supplemental Register.

4. Amendments to Allege Use under Section 1(c) of the Act

As stated earlier, an intent-to-use applicant must file either an amendment to allege use under Trademark Act Section 1(c), 15 U.S.C. 1051(c), or a statement of use under Trademark Act Section 1(d), 15 U.S.C. Section 1051(d), as a precondition to issuance of the registration. This section will discuss amendments to allege use only; the statement of use will be discussed below (A.8. and 9.).

a. Form and Permissible Time Period for Filing an Amendment to Allege Use under Section 1(c) of the Act

Any paper which includes an amendment to allege use under Section 1(c) of the Act should be entitled "Amendment to Allege Use" whether or not it includes other amendments. This title should appear at the top of the first page. Trademark Rule 2.76(d), 37 C.F.R. Section 2.76(d). This practice is recommended, not required. It will assist in the prompt and orderly processing of papers. The Office will not take any action to require a proper title.

An applicant may file an amendment to allege use under Section 1(c) of the Act at any time after filing the application and before the date the examining attorney approves the mark for publication or before the expiration of the six-month response period after issuance of a final action. Trademark Rule 2.76(a), 37 C.F.R. Section 2.76(a). If the applicant files an amendment to allege use after the time indicated, and before the permissible period for filing a statement of use, the review and amendment clerk will return the amendment to allege use and any fees to the applicant. The applicant may resubmit the amendment to allege use as a statement of use after issuance of the notice of allowance.

If the applicant submits a late amendment to allege use on the same paper with other amendments, the review and amendment clerk will retain the papers for appropriate processing of the other amendments and will advise the applicant that the amendment to allege use is late and must be resubmitted as a statement of use after issuance of the notice of allowance. The review and amendment clerk will arrange a refund of any fees in conjunction with this notification.

If the amendment to allege use is filed within the time permitted and complies with the minimum requirements to be referred for examination on the merits, but the application was approved for publication before the amendment to allege use was associated with the file, the examining attorney should withdraw the application from publication and examine the amendment to allege use.

If the applicant files the amendment to allege use in conjunction with a notice of appeal, the Trademark Trial and Appeal Board will institute the appeal, suspend action on the appeal and remand the case to the examining attorney to examine the amendment to allege use. The examining attorney should continue examination according to standard examining procedures until final resolution of all new issues arising in the examination of the amendment to allege use.

If the application becomes abandoned in the course of the examination of the amendment to allege use, the examining attorney will advise the Trademark Trial and Appeal Board. If the application is not abandoned in the course of the examination of the amendment to allege use, that is all issues are resolved or made the subject of a final action, the examining attorney should return the application to the Trademark Trial and Appeal Board for resumption of the appeal or other action, as appropriate. Trademark Rule 2.142(f)(3), 37 C.F.R. Section 2.142(f)(3).

The Office will not accept an amendment to allege use during the pendency of an ex parte appeal unless the amendment to allege use was filed within the six-month response period after issuance of the final action from which the appeal was taken.

The applicant may file the amendment to allege use only after the applicant has made use of the mark on or in connection with all goods or services for which the applicant will ultimately seek registration in the application, unless the applicant specifically requests that the application be divided. Trademark Rule 2.76(c), 37 C.F.R. Section 2.76(c). Trademark Rule 2.87, 37 C.F.R. Section 2.87, permits an applicant to divide the application into two or more separate applications. While an applicant can request division for any reason, the purpose of dividing the application in this case would be to effect publication or issuance of a registration for goods or services on or in connection with which the applicant had already made use while maintaining an active application for the remaining goods or services. The requirements attendant to submission of a request to divide an application are discussed more fully below (B.15.).

The filing of an amendment to allege use does not relieve the applicant of the duty to file a response to an outstanding Office action or to take any other action required in the case, including the filing of a notice of appeal. As noted, in the case of an appeal, the Trademark Trial and Appeal Board will remand the case for examination of the amendment to allege use.

b. Necessary Elements in a Complete Amendment to Allege Use under Section 1(c) of the Act

The amendment to allege use must include the following elements:

i. a verified statement that the applicant is believed to be the owner of the mark and that the mark is in use in commerce, specifying the date of the applicant's first use of the mark and first use of the mark in commerce, the type of commerce, those goods or services specified in the application on or in connection with which the mark is in use in commerce and the mode or manner in which the mark is used;

ii. three specimens or facsimiles of the mark as used in commerce conforming to the requirements of Trademark Rules 2.56, 2.57 and 2.58, 37 C.F.R. Sections 2.56, 2.57 and 2.58; and

iii. the prescribed fee.

Trademark Rule 2.76(b), 37 C.F.R. Section 2.76(b).

The fee for filing an amendment to allege use is $100.00 per class.

c. Minimum Requirements for an Amendment to Allege Use under Section 1(c) of the Act

The amendment to allege use must include the following minimum elements to be referred to the examining attorney for examination on the merits:

i. the prescribed fee;

ii. at least one specimen or facsimile of the mark as used in commerce; and

iii. a verification or declaration signed by the applicant stating that the mark is in use in commerce.

Trademark Rule 2.76(e), 37 C.F.R. Section 2.76(e).

The review and amendment clerk will conduct a preliminary review of the amendment to allege use to determine whether it is timely and complies with the minimum requirements. This preliminary review is similar to the review in the Application Section for filing-date requirements in a new application. If the amendment to allege use is timely and does comply with those requirements, the review and amendment clerk will refer the application to the responsible examining attorney for examination of the amendment to allege use on the merits.

If the amendment to allege use is untimely, the review and amendment clerk will return it to the applicant. If the applicant has submitted other amendments on the same paper with an untimely amendment to allege use, the review and amendment clerk will notify the applicant that the amendment to allege use is untimely and will not be considered and will process the other amendments, as appropriate, without consideration of the amendment to allege use. If a fee has been submitted, the review and amendment clerk will process the refund of the fee. The applicant may resubmit the amendment to allege use as a statement of use after issuance of the notice of allowance. Trademark Rule 2.76(f), 37 C.F.R. Section 2.76(f).

If the amendment to allege use is timely, but does not comply with the minimum requirements specified above, the review and amendment clerk will advise the applicant of the deficiency. The applicant may correct the deficiencies, provided the applicant does so before the mark has been approved for publication or the expiration of the response period after issu-

ance of a final refusal. Trademark Rule 2.76(a), 37 C.F.R. Section 2.76(a). The review and amendment clerk should place the informal amendment to allege use in the file with copies of the relevant action advising the applicant of the deficiencies. If the applicant does not correct the deficiencies before approval of the mark for publication or before the expiration of the response period for a final refusal, the amendment to allege use will not be examined. In such a case, if the applicant has submitted the fee, the fee will not be refunded. If the mark is published for opposition, the applicant may file a statement of use after issuance of the notice of allowance.

If the amendment to allege use is not signed, the review and amendment clerk will hold it not in compliance with the minimum requirements and will require that the applicant submit a properly signed amendment to allege use. The review and amendment clerk will not inquire into the authority of the person who signed. The examining attorney will examine this issue if and when the amendment to allege use is referred for examination on the merits.

After the review and amendment clerk has taken appropriate action with respect to any deficient amendment to allege use, the review and amendment clerk will process any other amendments filed with the amendment to allege use and will refer the case to the responsible examining attorney for appropriate action on those other amendments.

As noted previously, the filing of an amendment to allege use does not constitute a response to any outstanding Office action in the case. The applicant must respond to any such action within the time provided to avoid abandonment of the application. Trademark Rule 2.76(g), 37 C.F.R. Section 2.76(g).

If the review and amendment clerk has issued an action holding the proposed amendment to allege use not in compliance with the minimum requirements, the examining attorney will act on any other amendments in the case without consideration of the amendment to allege use. The examining attorney should issue requirements or refusals in nonfinal or final form according to standard examination procedure without consideration of the amendment to allege use. Any specimens submitted, as in the case of specimens related to an amendment to allege use which is withdrawn, become part of the record and may be relied on in relation to issues unrelated to use.

If the examining attorney determines that the review and amendment clerk erred in holding that the amendment to allege use did not meet the minimum requirements to be referred for examination on the merits, the examing attorney should telephone to advise the applicant the the amendment to allege use will be examined on the merits and to disregard the review and amendment clerk's action citing deficiencies.

d. Examination of the Amendment to Allege Use by the Examining Attorney

The examing attorney must examine the amendment to allege use for compliance with all relevant sections of the Act. If the examination of the amendment to allege use raises any issues necessitating the issuance of requirements or refusals, the examining attorney must take appropriate action, as discussed below. The following sections present examples of issues which should be examined in relation to the amendment to allege use. These sections do not exhaust all possibilities, but present a general framework governing the areas for examination.

i. Ownership and Proper Execution

The examing attorney must confirm that the proper party has executed the amendment to allege use. The party submitting the amendment to allege use must be the same as the applicant or a valid assignee under Trademark Act Section 10, 15 U.S.C. Section 1060.

The person who executes the amendment to allege use must be entitled to do so on behalf of the applicant. The same persons identified as possessing the authority to sign the original application under Trademark Act Section 1, 15 U.S.S. Section 1051,are the only persons possessing the authority to sign the amendment to allege use. That is, only the individual owoner can sign for a partnership for an individual applicant, only a general partner can sign and only an officer can sign for a corporation or association. If the amendment to allege use is not signed by one of these persons, the examining attorney must require that the applicant submit a substitute amendment to allege use signed by a proper person, or that a proper person execute an affidavit or declaration verifying the facts as set forth in the amendment to allege use.

The color of authority provision of Trademark Rule 2.71 (c), 37 C.F.R. Section 2.71 (c), does not apply to amendments to allege use.However, the applicant need not demonstrate that the person who signed originally had color of authority because the applicant may submit a substitute declaration within the response period set in the examining attorney's action, whether or not the person who signed originally had color of authority. The specific date on which the applicant submits the amendment to allege use does not have the same importsance as the filing date for the application or the statement of use, since the amendment to allege use can be submitted up to the expiration of the six-month response period following a final action, including a final action requiring execution by a proper person.

ii. The Verified Statement and the Identification of Goods and Services

The examining attorney must examine the verified statement to ensure that the statement includes the necessary averments, that the dates are properly stated, that the type of commerce is indicated and that the mode of use is set forth. If the statement is defective, the examining attorney must require appropriate amendment.

The examining attorney must also examine the identification of goods and services to ensure that it conforms to the goods and services specified in the application. The applicant may limit or clarify the goods and services, but the applicant cannot add to or otherwise expand the identification of goods or services specified in the application.

If goods or services identified in the application are omitted from the amendment to allege use, but the applicant has not specifically indicated an intention to delete those goods or services from the application, the examining attorney should confirm that the applicant intends to delete the omitted goods or services. The applicant may amend the application to reinsert goods or services which have been omitted from the amendment to allege use, provided the applicant did not expressly delete the goods or services by amendment and provided the applicant verifies that it has used the mark in commerce on or in connection with the goods or services in an affidavit or declaration under Trademark Rule 2.20, 37 C.F.R. Section 2.20. Omission of goods or services in an amendment to allege use or statement of use is the only instance in which an applicant may reinsert goods or services. The general rule is that goods and services once deleted by express amendment or omitted from the identification of goods and services in a request for an extension of time to file a statement of use may not be reinserted in a later amendment.

iii. The Specimens

The examining attorney must review the specimens for compliance with all relevant requirements. The examining attorney must confirm that the designation is used as a mark on the specimens. The examining attorney must determine whether the specimens indicate descriptive or generic use of the mark. The examining attorney must examine the specimens to determine whether any issue concerning ownership of the mark is presented.

The clear-error standard which limits the issues that may be raised in examination of the statement of use does not apply to the examination of the amendment to allege use. However, the examining attorney must raise all possible issues, such as descriptiveness issues, in the initial examination without regard to whether the applicant will file an amendment to allege use or a statement of use. The applicant may do either, and the examining attorney may be precluded from raising an issue under the clear-error standard if the applicant files a statement of use.

If the applicant submits substitute specimens in conjunction with an amendment to allege use, the applicant need not verify that the substitute specimens were in use as of any specific date, but merely that the substitute specimens were used in commerce in connection with the goods or services.

iv. The Drawing

Trademark Rule 2.51, 37 C.F.R. Section 2.51, specifies that the drawing in an intent-to-use application must be a substantially exact representation of the mark as intended to be used *and* as actually used upon filing of the amendment to allege use before publication or the statement of use after issuance of the notice of allowance. Trademark Rule 2.88(j), 37 C.F.R. Section 2.88(j). An applicant may not amend the mark in a drawing if the amendment constitutes a material alteration of the mark. Also, the mark in the drawing must agree with the mark as used on the specimens. The same standards which apply to use applications in determining whether specimens support use of the mark and in determining whether amendments can be permitted apply in the examination of the amendment to allege use.

Therefore, in an intent-to-use application, the examining attorney must require amendment to the mark or the submission of new specimens if the mark in the drawing is not a substantially exact representation of the mark as used on the specimens. Trademark Rule 2.72(c), 37 C.F.R. Section 2.72(c). However, if amendment of the mark would constitute a material alteration of the mark, the examining attorney must require substitute specimens only. The same standards applied in use applications in determining whether the specimens support use of the applied-for mark apply to specimens in intent-to-use applications. See Examination Guide 2-89. *Cf. United Rum Merchants Ltd. v. Distillers Corp. (S.A.) Ltd.*, 9 USPQ2d 1481 (TTAB 1988).

e. Issuance of Actions by the Examining Attorney Related to the Amendment to Allege Use

If, upon examination, the examining attorney determines that the amendment to allege use is not acceptable, or that it raises new issues in the case, the examining attorney will issue an action stating all refusals and requirements arising in the examination of the amendment to allege use and incorporating all unresolved issues from any outstanding Office action in the case. The action related to the amendment to allege use thus supersedes any outstanding Office action, and the applicant's response on all issues is due six months from the date of the new action. The new action will be a nonfinal action since at least those issues arising from the examination of the amendment to allege use will have been raised for the first time.

If the amendment to allege use is received before any examination of the application, the review and amendment clerk will review the amendment to allege use to determine whether it complies with the minimum requirements and will take appropriate action. The review and amendment clerk will return the case to the new case docket after taking appropriate action. When the case is reached for examination, the examining attorney will examine the application as a whole, including the amendment to allege use, and will issue a first action addressing all issues in the case.

If the review and amendment clerk reviews the amendment to allege use and refers it to the examining attorney for examination on the merits, the examining attorney should examine the amendment to allege use regardless of the status of the application. If the application is in suspended status, the examining attorney should examine the amendment to allege use, and if any action is required, the examining attorney should remove the application from suspension and take appropriate action.

If the amendment to allege use is submitted at the same time as a response and it is referred for examination on the merits, the examining attorney should consider both the response and the amendment to allege use. If the examining attorney must take any action with respect to the amendment to allege use, the examining attorney should issue a nonfinal action incorporating any refusals or requirements which remain outstanding after the applicant's response. If the amendment to allege use is acceptable in all respects, the examining attorney should act on the response independent of the amendment to allege use. The examining attorney should proceed in the same manner if the amendment to allege use reaches the examining attorney when the case is in the examining attorney's amended docket after receipt of a response.

f. Amendment and Withdrawal of the Amendment to Allege Use

The applicant may amend the amendment to allege use to correct deficiencies, to overcome a refusal, to comply with a requirement or for any other purpose. *Cf.* Trademark Act Section 1(d)(3), 15 U.S.C. Section 1051(d)(3).

The applicant may withdraw the amendment to allege use. The applicant or the applicant's attorney may authorize withdrawal in an examiner's amendment. The applicant may do so at any time after submission of the amendment to allege use and before approval of the application for publication. The Office will not refund the fee for filing the amendment to allege use if it is withdrawn by the applicant.

If the applicant withdraws the amendment to allege use, the application will be processed as an intent-to-use application subject to publication, issuance of a notice of allowance and submission of a statement of use after issuance of the notice of allowance.

If the applicant wishes to request withdrawal of an amendment to allege use during an ex parte appeal, the applicant should direct the request to the Trademark Trial and Appeal Board for a determination by the Board on the request.

If the applicant withdraws the amendment to allege use, the examining attorney will withdraw any requirements or refusals specifically related to use of the mark, such as objections related to the form of the verified statement itself, objections related to the agreement of the mark as used with the drawing or objections related to use of the applied-for designation as a trademark or service mark on the specimens. The examining attorney should also withdraw any requirement or refusal related to the execution of the amendment to allege use. The examining attorney should maintain any requirement or refusal arising from the amendment to allege use not specifically related to the dates of use or use of the mark, such as ownership questions or refusals or requirements related to Sections 2(e)(1), 2(e)(2) or 2(e)(3) of the Act. The specimens or any other submission related to the amendment to allege use will remain part of the record for the purpose of determinations under these sections. Issues related to use include functionality, ornamentation and configuration issues.

If the applicant withdraws the amendment to allege use after issuance of the notice of final acceptance of the amendment to allege use, the examining attorney must withdraw the acceptance on the TRAM system.

g. Final Acceptance of the Amendment to Allege Use After Examination

If the amendment to allege use is acceptable in all respects, the Office will notify the applicant of its acceptance. The examining attorney will ensure that the computer-generated notice is issued. The examining attorney must also sign the file to indicate acceptance of the amendment to allege use. As noted above, after an amendment to allege use is accepted, the intent-to-use application will be processed in the same manner as a use application under Trademark Act Section 1(a), 15 U.S.C. Section 1051(a). The notification must be sent regardless of the status of the case, whether there is an outstanding Office action or not. Examination should continue on other issues in the case after the acceptance of the amendment to allege use.

5. Publication for Opposition and Issuance of the Notice of Allowance

In the case of an intent-to-use application, if the examining attorney determines that the mark is entitled to registration, but for the submission of a statement of use, that is, no amendment to allege use has been accepted, the examining attorney will approve the mark for publication and the mark will be published for opposition. In the case of an intent-to-use application where an amendment to allege use has been submitted and accepted, the application will be processed thereafter in the same manner as a use application. If the application is not opposed or survives all oppositions filed, the mark will proceed to registration.

In the case of an intent-to-use application where no amendment to allege use has been filed or where the applicant has withdrawn the amendment to allege use, the Office will issue a notice of allowance, provided the mark clears the opposition period or survives all oppositions. Trademark Act Section 13(b)(2), 15 U.S.C. Section 1063(b)(2); Trademark Rule 2.81(b), 37 C.F.R. Section 2.81(b).

The notice of allowance in an intent-to-use application will issue on the same date that a registration would issue in a use application. The Office will not publish any notice that a notice of allowance has been issued in the *Official Gazette*.

The notice of allowance will state the serial number of the application, the name of the applicant, the correspondence address, the mark, the identification of goods or services, and the date of issuance of the notice of allowance. The notice of allowance is a key document because the issuance date establishes the due date for submission of the statement of use required prior to registration. The information stated on the notice of allowance is also important. If the notice of allowance includes any errors, the applicant should notify the Office immediately.

6. Amendments between Issuance of the Notice of Allowance and Submission of the Statement of Use

The only amendment permitted between the issuance of the notice of allowance and the submission of the statement of use is an amendment to delete goods or services. Trademark Rule 2.77, 37 C.F.R. Section 2.77. "Deletion" means the elimination of an existing item in an identification of goods and services in its entirety. Deletion is distinct from other types of amendments to limit, such as amendments to limit the goods as to types, channels of trade or class of purchasers or to restrict an existing item in scope by the introduction of some qualifying language or the substitution of specific for more general terms. The Office will not consider any other amendment to the application during this period. If the applicant submits any other amendments during this period, the Office will place the amendments in the file for consideration at the time of examination of the statement of use. The ITU paralegal will advise the applicant of receipt of any such amendment and that the amendment will not be considered until the examination of the statement of use.

The Office will process any change of address or change of attorney at any time during the prosecution of an application, even during the period between issuance of the notice of allowance and the filing of the statement of use.

7. Requests for Extensions of Time to File the Statement of Use

Trademark Act Section 1(d)(2), 15 U.S.C. Section 1051(d)(2), permits the Office to extend the time for filing a statement of use upon a written request from the applicant. Trademark Rule 2.89, 37 C.F.R. Section 2.89, sets forth Office policy and procedure governing the filing and processing of such requests. Essentially, an applicant may request one six-month extension without a showing of good cause and up to four additional six-month extensions with a showing of good cause. Thus, the time available for filing the statement of use may not be extended beyond thirty-six months from the issuance of the notice of allowance.

The six-month period following issuance of the notice of allowance will not be cut short by the grant of an extension. The extension will begin to run from the expiration of the six-month period following the notice of allowance. Likewise, an applicant will receive the full benefit of each extension before a subsequent extension will begin to run. No extension will be granted for more than six months. Trademark Rule 2.89(b), 37 C.F.R. Section 2.89(b).

The only amendment which is permitted in connection with the filing of a request for an extension of time is an amendment to delete goods or services. If any other amendment is submitted in conjunction with a request for an extension of time, the Office will place the amendment in the application file for consideration at the time of examination of the statement of use. The Office will process any change of address or change of attorney at any time during the prosecution of an application, even if filed in conjunction with a request for an extension of time.

Any request for an extension of time must be filed by the entity which owns the mark at the time the request is filed and must be executed by an individual possessing statutory authority to do so on behalf of the specific type of applicant entity. The individual must sign for an individual applicant, a general partner must sign for a partnership and an officer must sign for a corporation or association. If the party filing is different from the owner of record, the request should include the reel and frame number of any relevant assignment recorded in the Assignment Branch of the Office or other evidence that the party filing is the owner of the application in accordance with Trademark Rule 2.186, 37 C.F.R. Section 2.186. If the request does not include such evidence the ITU Unit will deny the request. The applicant may establish ownership within the time provided in the action advising the applicant of the denial, even if the time permitted for filing the statement of use has expired. However, the applicant must file another request for an extension of time before the time period related to the request which is under consideration expires to avoid abandonment.

As noted above (A.7.), only those individuals who possess statutory authority to sign the original application are permitted to sign the request for an extension of time. If the request is signed by any other person, the request for an extension of time will be denied. Because the request must include a statement of a continued bona fide intention to use the mark in commerce, only the applicant can execute the request under the Act. In the case of a request for an extension of time, the request cannot be reexecuted by one with proper authority after the expiration of the time permitted for filing the statement of use. The "color of authority" provision of Trademark Rule 2.71(c), 37 C.F.R. Section 2.71(c), does not apply to the filing of requests for extensions of time.

a. Requirements Related to the First Six-Month Extension

The applicant may request an initial six-month extension of time to file the statement of use by filing a request for such an extension before the expiration of the six-month period following the issuance of the notice of allowance. The request must include the prescribed fee of $100.00 per class and a verified statement signed by the applicant that the applicant has a continued bona fide intention to use the mark in commerce. The statement must specify those goods or services specified in the notice of allowance on or in connection with which the applicant has a continued bona fide intention to use the mark in commerce. Trademark Rule 2.89(a), 37 C.F.R. Section 2.89(a). The applicant may incorporate the goods and services specified in the notice of allowance by reference.

b. Requirements Related to Extensions Beyond the First Six-Month Extension - Good Cause Extensions

The applicant may request up to a maximum of four six-month extensions to file the statement of use in addition to the first six-month extension. Each request for such an extension must be filed before the expiration of the previously granted extension. The request must include the prescribed fee of $100.00 and a verified statement signed by the applicant that the applicant has a continued bona fide intention to use the mark in commerce. The statement must specify those goods or services specified in the notice of allowance on or in connection with which the applicant has a continued bona fide intention to use the mark in commerce. In addition, each such request must include a showing of good cause. Trademark Rule 2.89(b), 37 C.F.R. Section 2.89(b).

The showing of good cause must include an allegation that the applicant has not yet made use of the mark in commerce on or in connection with all of the goods or services specified in the notice of allowance for which the applicant has a continued bona fide intention to use the mark in commerce. The showing must also include a statement of applicant's ongoing efforts to use the mark in commerce on or in connection with the goods or services specified as those for which the applicant has a continued bona fide intention to use the mark in commerce. Trademark Rule 2.89(d), 15 U.S.C. Section 2.89(d).

Efforts to use the mark in commerce may include "...without limitation, product or service research or development, market research, manufacturing activities, promotional activities, steps to acquire distributors, steps to obtain required governmental approval, or other similar activities." Trademark Rule 2.89(d)(2), 37 C.F.R. Section 2.89(d)(2). In the alternative, the applicant must submit a satisfactory explanation for the failure to make such efforts. The applicant's statement concerning good cause need only refer to the appropriate types of activities listed in the rule or similar types of activities. The applicant need not provide an explanation or evidence providing details as to specific activities related to the types delineated. For instance,

the applicant may simply state that it is engaged in manufacturing activities and promotional activities.

Any request for an extension of time, including the showing of good cause, will become a part of the permanent Office record and open to the public as such. As noted, the showing of good cause need only provide general statements identifying the types of efforts the applicant has undertaken as stated in the rule. The showing need not state specific facts which would disclose confidential business information or other proprietary information. The Office will not require any evidence or explanation in a showing of good cause.

c. Identifying the Goods and Services in the Request for an Extension of Time

The goods and services identified in the request for an extension of time must conform to the goods and services identified in the notice of allowance. If appropriate, the applicant may incorporate the specification of goods and services in the notice of allowance by reference. If goods or services are to be deleted, the applicant should clearly specify those goods and services to be deleted.

If the applicant lists the goods and services specifically in the request for an extension of time, and omits any goods or services which were listed in the notice of allowance, the Office will delete those goods or services from the application and will not grant the request as to the omitted items. Likewise, if the applicant lists the goods and services specifically, and the wording in the listing of the goods and services in the request does not conform to the wording of the specification of goods and services in the notice of allowance, the Office will delete from the application any wording not expressly included in the request in conforming language and will not grant the request as to the deleted items. The applicant cannot amend the application later to reinsert the deleted goods or services once they have been so deleted. Trademark Rule 2.89(f), 37 C.F.R. Section 2.89(f).

The paralegal in the ITU Unit will examine the identification of goods and services specified in the extension request to determine whether the goods and services specified conform to the goods and services specified in the notice of allowance. The paralegal will delete any items from the identification of goods and services in the application which are not either incorporated by reference or specified in the extension request in conforming language.

As noted above, applicants may incorporate goods and services by reference in the request for an extension of time. It is advisable to do so, if appropriate, to avoid the possibility that goods or services will be deleted unintentionally. Thus, the applicant may specify the goods or services by stating "those goods or services identified in the notice of allowance" or "those goods or services identified in the notice of allowance except..." followed by an identification of goods or services to be deleted.

The only amendment permitted between issuance of the notice of allowance and filing of the statement of use is an amendment to delete goods or services. Trademark Rule 2.77, 37 C.F.R. Section 2.77. "Deletion" means the elimination of an item from the identification of goods and services in its entirety as distinct from other types of amendments to limit, such as amendments to limit the goods as to types, channels of trade or class of purchasers or to restrict an existing item in scope by the introduction of some qualifying language or the substitution of specific for more general terms. The ITU paralegal will not process any proposed amendments filed with the request for an extension of time, other than deletions, and will place other amendments in the file for consideration at the time of examination of the statement of use. The paralegal will act on the extension request, apart from any such proposed amendment, as specified above.

d. Filing a Request for an Extension of Time in Conjunction with a Statement of Use

An applicant may file one final request for an extension of time at the time of filing the statement of use or during any time remaining in the existing six-month period in which a statement of use is filed. However, such a request is not permitted if the grant of such an extension would extend the time for filing more than thirty-six months beyond the issuance of the notice of allowance. Trademark Rule 2.89(e), 37 C.F.R. Section 2.89(e). The applicant may not request any further extensions of time after this request.

The purpose of such a request would be to secure additional time to correct any deficiency in the statement of use which is of a type which must be corrected before the expiration of the time permitted for filing the statement of use. Because the statement of use may not be withdrawn, the applicant must correct any such deficiency within the time provided to file the statement of use or the application will become abandoned.

The request must conform to all relevant requirements including payment of the applicable fee. If the request is not the first request for an extension of time, and thus a showing of good cause is required with the request for an extension of time filed with or after the statement of use, the applicant may satisfy the requirement for a showing of good cause by asserting that applicant believes that it has made valid use of the mark in commerce, as evidenced by the submitted statement of use, but that if the statement of use is found to be fatally defective, the applicant will need additional time to file a statement of use. Trademark Rule 2.89(e)(2), 37 C.F.R. Section 2.89(e)(2).

If the applicant files a final request for an extension of time in conjunction with a statement of use, and the applicant submits fees sufficient for one, but not both, the Office will apply the fees to the extension of time to avoid abandonment of the application.

e. Processing of the Request for an Extension of Time

The Office will notify the applicant of the grant or denial of the request for an extension of time. Trademark Rule 2.89(g), 37 C.F.R. Section 2.89(g). Any denial will specify the reasons for the denial. The Office's failure to notify the applicant of the grant or denial of the extension before the expiration of the existing period to file the statement of use or before the expiration of the period requested does not relieve the applicant of the responsibility to file the statement of use or a request for an extension of time within the relevant period. If the applicant fails to file the statement of use or a request for an extension of time within the time permitted, the application will become abandoned. Trademark Act Section 1(d)(4), 15 U.S.C. Section 1051(d)(4).

If the Office denies the request for an extension of time but time remains in the applicant's existing period for filing the statement of use, the applicant may file the statement of use or another request for an extension of time to file the statement of use. Otherwise, the applicant's only recourse after denial of the request for an extension of time is a petition to the Commissioner. A petition from the denial of a request for an extension must be filed within one month from the mailing date of the denial of the extension of time. Trademark Rule 2.89(g), 37 C.F.R. Section 2.89(g). The ITU Unit will not accept any request to reconsider a denial of a request for an extension of time. The ITU Unit will be responsible for processing all requests for extensions of time to file statements of use.

8. Submission of the Statement of Use under Section 1(d) of the Act

As noted earlier (A.1.a.), an intent-to-use applicant must file either an amendment to allege use under Trademark Act Section 1(c), 15 U.S.C. 1051(c), or a statement of use under Trademark Act Section 1(d), 15 U.S.C. Section 1051(d), as a precondition to issuance of the registration. This section will discuss statements of use only; the amendment to allege use is discussed above (A.4.).

a. Form and Permissible Time Period for Filing a Statement of Use under Section 1(d) of the Act

The statement of use should be entitled, "Statement of Use under Section 2.88." Trademark Rule 2.88(d), 37 C.F.R. Section 2.88(d). The title should be placed at the top of the first page. The mailing address should specify "Box ITU" also. Proper identification of the statement of use will expedite handling, but the Office will not take any action for failure to comply with these recommendations. The applicant may submit other amendments related to the application with the statement of use.

The statement of use must be filed within six months of the issuance date of the notice of allowance or within an extension of time for filing the statement of use granted under Trademark Rule 2.89, 37 C.F.R. Section 2.89. For purposes of establishing a date of receipt, the statement of use is not subject to the certificate-of-mailing procedure under Rule 1.8, 37 C.F.R. Section 1.8. The statement of use will be considered received on the date it is actually received or on the Express-Mail date under Rule 1.10, 37 C.F.R. Section 1.10.

Any statement of use filed before mailing of the notice of allowance is premature and will not be considered. In such a case, the ITU Unit will return the statement of use and refund the fee to the applicant. Trademark Rule 2.88(a), 37 C.F.R. Section 2.88(a). If the statement of use is not filed or is filed later than required, the application will be considered abandoned. Trademark Act Section 1(d)(4), 15 U.S.C. Section 1051(d)(4); Trademark Rule 2.88(h), 37 C.F.R. Section 2.88(h). A late statement of use will not be considered. The ITU Unit will return the late statement of use to the applicant with any fees paid.

The applicant may file the statement of use only after the applicant has made use of the mark on or in connection with all goods or services for which the applicant will ultimately seek registration in the application, unless the applicant specifically requests that the application be divided. Trademark Rule 2.88(c), 37 C.F.R. Section 2.88(c). Trademark Rule 2.87, 37 C.F.R. Section 2.87, permits an applicant to divide the application as filed into two or more separate applications. The purpose of filing a request to divide an application in conjunction with the filing of a statement of use would be to effect issuance of a registration for goods or services on or in connection with which the applicant has already made use while maintaining an active application for the remaining goods or services. After the division all applications retain the original filing date. The requirements attendant to submission of a request to divide an application are discussed below (B.15.).

b. Necessary Elements in a Complete Statement of Use under Section 1(d) of the Act

The statement of use must include the following elements:

i. a verified statement that the applicant is believed to be the owner of the mark and that the mark is in use in commerce, specifying the date of the applicant,s first use of the mark and first use of the mark in commerce, the type of commerce, those goods or services specified in the notice of allowance on or in connection with which the mark is in use in commerce and the mode or manner in which the mark is used;
ii. three specimens or facsimiles of the mark as used in commerce; and
iii. the prescribed fee.

Trademark Rule 2.88(b), 37 C.F.R. Section 2.88(b).

The filing fee for a statement of use is $100.00 per class.

c. Minimum Requirements for a Statement of Use under Section 1(d) of the Act

The statement of use must include the following minimum elements to be referred to the examining attorney for examination on the merits:
i. the prescribed fee;
ii. at least one specimen or facsimile of the mark as used in commerce; and
iii. a verification or declaration signed by the applicant stating that the mark is in use in commerce.
Trademark Rule 2.88(e), 37 C.F.R. Section 2.88(e).

The ITU Unit will review the statement of use to determine whether it is timely and whether it complies with the minimum requirements. As noted above (A.8.a.), if the statement of use is untimely, either because it is premature or late, the ITU Unit will return the statement of use with any fees to the applicant.

If the statement of use is timely, but does not comply with one or more of the minimum requirements, the ITU Unit will advise the applicant of the deficiency. The applicant may correct the deficiency provided the time permitted for filing the statement of use has not expired. Trademark Rule 2.88(g), 37 C.F.R. Section 2.88(g). If the applicant does not correct the deficiency before the expiration of the relevant time period, the statement of use will not be examined and the application will be declared abandoned. In such a case, if the applicant has submitted the fee, the ITU Unit will not refund the fee.

The applicant may not withdraw the statement of use and return to the previous status of awaiting filing of the statement of use, even if the statement of use as filed fails to meet the minimum requirements. Trademark Rule 2.88(g), 37 C.F.R. Section 2.88(g). The applicant may request extensions of time to file the statement of use in accordance with Trademark Rule 2.89, 37 C.F.R. Section 2.89, as discussed above (A.7.e.), including a final request for an extension filed with a statement of use or during the time remaining in the existing period in which the statement of use is filed.

The Office will not issue a filing receipt to acknowledge receipt of a statement of use.

If an applicant files a statement of use and a request to divide the application at the same time, and the fees submitted are insufficient for both, the fees will be applied to the statement of use first and the applicant will be notified of the deficiency.

9. Examination of the Statement of Use

If the statement of use is timely and complies with the minimum requirements, the ITU Unit will refer the entire application with the statement of use to the responsible examining attorney for examination on the merits. The same examining attorney who examined the application initially will examine the statement of use unless the examining attorney has left the Office or assumed other duties.

a. Procedures Governing Examination of the Statement of Use

Examination of the statement of use follows the same procedural course as the initial examination of the application under Trademark Rule 2.61 et seq., 37 C.F.R. Section 2.61 et seq. The examining attorney should issue actions, as appropriate, stating requirements and refusals and culminating in final action or acceptance of the statement of use. The examining attorney may issue examiners amendments or priority actions, as appropriate. The applicant must respond to actions within six months under routine Office procedure. If the examining attorney ultimately finds the statement of use acceptable in all respects, the Office will notify the applicant of its acceptance. The Office will then publish notice of the registration of the mark and will issue the registration to the applicant. The application is not once again subject to opposition. Trademark Rule 2.151, 37 C.F.R. Section 2.151.

If the examining attorney issues any requirements or refusals, the applicant may respond under standard examination procedure. The applicant may appeal or petition matters in the same manner and subject to the same procedures which would apply in the initial examination of the application.

The applicant may amend or otherwise correct the statement of use during examination, provided the applicant had complied with the minimum requirements attendant to the statement of use before the expiration of the time permitted to file the statement of use.

i. Complying with Minimum Requirements within the Time Permitted

The applicant must make valid use of the mark in commerce and must file a statement of use meeting the minimum requirements, including at least one specimen, before the expiration of the time permitted to file the statement of use. Trademark Rule 2.71(d)(3), 37 C.F.R. Section 2.71(d)(3). The applicant can provide substitute specimens, during examination, after the expiration of the time permitted to file the statement of use. However, the applicant must verify that the specimens were in use before the expiration of the time permitted for filing the statement of use. If the applicant attempts to amend the dates of use to state a date of first use in commerce which is later than the time permitted for filing the statement of use, the examining attorney must refuse registration because the applicant failed to make use within the time permitted and, as a result, the application is abandoned. The examining attorney must

refuse registration on the same grounds if the applicant cannot provide an acceptable specimen which was in use in commerce before the expiration of the time permitted for filing the statement of use.

Likewise, the party filing the statement of use must be the owner of the mark at the time of filing. However, even after the expiration of the time permitted for filing the statement of use, the applicant can provide information to establish that the party who filed was the owner at the time the statement of use was filed through a chain of title. Trademark Rule 2.186, 37 C.F.R. Section 2.186. The applicant must do so within the specified response period. However, if the party which did file was not the owner at the time of filing the statement of use, the applicant cannot provide a substitute statement of use or the equivalent to correct this error after the expiration of the time permitted for filing the statement of use. If the time permitted for filing the statement of use has not yet expired, the applicant may file a substitute statement of use in the name of the true owner.

Therefore, if the party filing the statement of use is not the owner of the mark at the time of filing the statement of use, the examining attorney must reject the statement of use. If no time remains within the time permitted for filing the statement of use, the examining attorney must refuse registration because the application is abandoned for failure to file the statement of use within the time permitted.

Also, the person who signs the statement of use must have the authority to do so under the Act. Only those persons who are authorized to sign the original application have authority to sign the statement of use: the individual for an individual applicant, a general partner for a partnership and an officer for a corporation or association. As in the case of the original application, the person who signs must have at least color of authority to sign in order for the statement of use to be considered received in the Office.

If the person who signed the statement of use lacked even color of authority to do so, the applicant cannot provide a statement of use or the equivalent, signed by a proper person, after the expiration of the time permitted to file the statement of use. If the person who signed the statement of use possessed at least color of authority, as discussed below (B.1.a.), the applicant can provide a substitute statement of use or an affidavit or declaration signed by the proper person verifying the facts as set forth in the statement of use after the expiration of the time permitted for filing the statement of use. Trademark Rule 2.71(c), 37 C.F.R. Section 2.71(c). The principles which govern the determination as to whether a person possesses color of authority are discussed below (B.1.a.) in relation to the signature requirements attendant to the filing of the original application.

If the person who signed the statement of use lacked even color of authority to so do, and the time permitted for filing the statement of use has expired, the examining attorney must refuse registration because the application is, therefore, abandoned for failure to file the statement of use within the time permitted.

ii. Correcting Defects

The applicant may correct defects in the statement of use after the expiration of the time permitted for filing the statement of use when compliance within the time permitted for filing the statement of use is not required by the Act. However, the applicant must respond to requirements related to these defects within the response periods established under standard examination procedure to avoid abandonment of the application.

As noted above (A.9.a.i.), the applicant may provide substitute specimens after the expiration of the time permitted for filing the statement of use. However, the applicant must verify that the substitute specimens were in use in commerce before the expiration of the time permitted for filing the statement of use.

As noted above (A.9.a.i.), the applicant may establish chain of title during examination, after the expiration of the time permitted for filing the statement of use. The applicant may establish color of authority of the person who signed the statement of use and provide a substitute statement of use signed by a proper person during examination after the expiration of the time for filing the statement of use. The applicant may correct the dates of use, subject to the limitations provided in Trademark Rule 2.71(d), 37 C.F.R. Section 2.71(d), or the method of use clause after the expiration of the time permitted for filing the statement of use. The applicant may amend the identification of goods and services, subject to the general restrictions governing such amendments under Trademark Rules 2.71(b) and 2.88(i)(1), 37 C.F.R. Sections 2.71(b) and 2.88(i)(1), after the expiration of the time permitted for filing the statement of use. The applicant may amend the drawing, subject to the restrictions generally governing amendments to drawings under Trademark Rule 2.72, 37 C.F.R. Section 2.72, during examination after the expiration of the time permitted for filing the statement of use.

iii. Withdrawal of the Statement of Use Prohibited

Once the applicant has filed the statement of use, the applicant may not withdraw the statement of use and return to the previous status of awaiting submission of the statement of use. Trademark Rule 2.88(g), 37 C.F.R. Section 2.88(g). The applicant may not do so, even if the Office determines that the statement of use does not comply with the minimum requirements. However, the applicant may amend the statement of use or file a substitute statement of use to correct even fatal defects within the time permitted for filing the statement of use.

b. The "Clear-Error" Standard in Examination of the Statement of Use

For the purpose of examination of the statement of use, the Office will issue requirements or refusals concerning matters specifically related to the statement of use only. The Office will not issue any requirements or refusals concerning matters which could have or should have been raised during initial examination, unless the failure to do so in initial examination constitutes a clear error. **"Clear error" refers to an error which, if not corrected, would result in issuance of a registration in violation of the Act.** *Cf. Century 21 Real Estate Corp. v. Century Life of America*, 10 USPQ2d 2034 (TTAB 1989); *Granny's Submarine Sandwiches, Inc. v. Granny's Kitchen, Inc.*, 199 USPQ 564 (TTAB 1978).

The examining attorney must act on all new issues in the examination of the statement of use. Examples of such issues are presented below (A.9.b.) in the discussion of various areas of examination related to the statement of use. For example, the examining attorney must issue an appropriate refusal if the specimens fail to show use of the designation as a mark. However, the examining attorney may not issue a refusal under Trademark Act Section 2(e)(1), 15 U.S.C. Section 1052(e)(1), unless the refusal is dictated by changed circumstances from the time of initial examination or the failure to issue such a refusal would constitute clear error.

If a significant length of time has elapsed since the initial examination, in some unusual circumstances, the mark may have become descriptive or even generic as applied to the goods or services. In such a case, the evidence of the descriptive or generic use would not have been available during initial examination.

However, if evidence that the mark is merely descriptive was available during initial examination, and thus the refusal could or should have been issued in initial examination, the examining attorney cannot issue the refusal unless clear error is present. That is, the evidence of descriptiveness must be substantial and unequivocal. The examining attorney should not issue such a refusal on the basis of information that was available during the initial examination unless clear error exists.

Likewise, the examining attorney must not issue requirements or refusals related to informalities which could or should have been addressed during the initial examination. For example, if the examining attorney determines that the initial declaration in support of the application was defective, the examining attorney should not issue a requirement for a new declaration.

If the goods or services were classified incorrectly and published for opposition in the wrong class, the examining attorney should require correction of the classification. In the case of any change of class after issuance of the notice of allowance, the mark must be republished for opposition unless the Petitions and Classification Attorney determines that republication is not necessary.

If a disclaimer could or should have been required during the initial examination, the examining attorney should not

require a disclaimer during the examination of the statement of use unless there is clear error. For example, a disclaimer of all of the wording in a mark may be required under the clear-error standard where the mark consists of merely descriptive wording and distinctive design elements. Issuance of a registration without such a disclaimer would violate the Act by affording the applicant rights beyond those to which the applicant is entitled. In other cases where the requirement for a disclaimer is subject to greater discretion, the clear-error standard would not permit a disclaimer requirement when it could or should have been stated in initial examination. The determination that a term is descriptive or generic related to the requirement for a disclaimer is subject to the substantial-and-unequivocal-evidence standard stated above.

Generally, the Office will not conduct any search for conflicting marks, or issue any refusals on that basis, in the examination of the statement of use. However, if the examining attorney determines that a second search is necessary, due to an amendment of the mark or an amendment of the goods or services, the examining attorney will conduct a second search and take action, as appropriate. Likewise, the Office may discover a clear error under Trademark Act Section 2(d), 15 U.S.C. Section 1052(d), in the course of internal Office quality review or through a letter of protest. The Office will not issue any refusal under Section 2(d) in the examination of the statement of use unless the failure to do so constitutes a clear error. For the purposes of Section 2(d), the conflict between the application and registration at issue must be such that reasonable minds could not differ as to the necessity for the refusal, that is, failure to issue the refusal would result in issuance of a registration in violation of the Act.

In the case of an intent-to-use application, as in all applications, the Office will deny as untimely letters of protest which are filed more than thirty days after publication of a mark. *In re Pohn*, 3 USPQ2d 1700 (Comm'r Pats. 1987).

c. Examination of the Verified Statement of Use

The examining attorney should review the statement of use itself to confirm that the statement conforms to the requirements of the Act and the rules. As noted above (A.8.a.), the statement must include an averment that the applicant is the owner of the mark, the dates of use, an identification of the goods and services and the method of use. The statement must be verified. Trademark Act Section 1(d), 15 U.S.C. Section 1051(d); Trademark Rule 2.88(b), 37 C.F.R. Section 2.88(b).

The averment of ownership and use in commerce are essential elements of the statement. If the averment of ownership is omitted, the examining attorney must require the applicant to submit a verified statement including this averment.

If the statement of use was executed before the stated dates of use, the examining attorney must require that the statement be re-executed. The dates of use may not be amended to a date later than the expiration of the time permitted for filing of the statement of use. The applicant must verify amendments to the dates of use in the statement of use as in the application itself. Trademark Rule 2.71(d), 37 C.F.R. Section 2.71(d).

The date of first use in commerce must be no earlier than the date of first use anywhere. Office policies governing the correction of dates which do not conform to this requirement in use applications apply to statements of use also. TMEP section 806.03. The applicant must state dates of use for each class. The dates of first use for each class must apply to at least one item in the class but need not apply to more than one item. However, the applicant must have used the mark on all items covered by the statement of use before execution of the statement unless the applicant requests to divide the application under Trademark Rule 2.87, 37 C.F.R. Section 2.87.

The applicant must identify the type of commerce according to the same standards which govern use applications. TMEP section 806.05.

The applicant must indicate the method of use. Office policies governing this requirement relative to use applications apply to the statement of use as well. TMEP section 808.09. If the method of use indicated in the statement of use is inconsistent with the intended method of use stated in the initial application, the examining attorney should assume that the later statement is controlling and should not raise this inconsistency as an issue in examination.

d. The Identification of Goods and Services in the Examination of the Statement of Use

"The goods or services specified in a statement of use must conform to those goods or services identified in the notice of allowance." Trademark Rule 2.88(i)(1), 37 C.F.R. Section 2.88(i)(1). The referenced rule further recommends that, in appropriate cases, applicants specify the goods or services by stating "those goods or services identified in the notice of allowance" or "those goods or services identified in the notice of allowance except. . ." followed by an identification of the goods or services to be deleted.

The rules preclude additions to the identification of goods or services in all applications, as noted below. Trademark Rule 2.71(b), 37 C.F.R. Section 2.71(b). If the applicant proposes to add to the identification of goods or services in conjuncion with the statement of use, the examining attorney must reject the amendment.

If the applicant omits any goods or services specified in the notice of allowance from the identification of goods or services in the statement of use, and the applicant has not expressed a clear intention to delete those goods or services, the examining attorney must inquire as to the discrepancy. The examining attorney will permit the applicant to amend the statement of use to reinsert any omitted goods or services, provided the applicant did not delete the goods or services expressly in an amendment and provided the applicant verifies that the mark was in use in commerce with those goods or services before the expiration of the time permitted to file the statement of use. Trademark Rule 2.88(i)(2), 37 C.F.R. Section 2.88(i)(2).

The applicant may amend to delete items or to limit the identification of goods and services. For example, the applicant may amend to limit the goods as to types, channels of trade or class of purchasers or to restrict an existing item in scope by the introduction of some qualifying language or the substitution of specific for more general terms. The applicant may clarify the identification of goods or services, provided the amendment does not exceed the scope of goods or services specified in the notice of allowance. The principles which govern amendments to delete, limit or clarify in general also apply in the examination of the statement of use. If, due to any amendment to the identification of goods and services, the international class must be amended, the application must be republished for opposition unless the Petitions and Classification Attorney determines that republication is not necessary.

e. Examination of the Statement of Use Related to the Drawing

Trademark Rule 2.51, 37 C.F.R. Section 2.51, specifies that the drawing in an intent-to-use application must be a substantially exact representation of the mark as intended to be used *and* as actually used upon filing of the amendment to allege use before publication or the statement of use after issuance of the notice of allowance. Trademark Rule 2.88(j), 37 C.F.R. Section 2.88(j). An applicant may not amend the mark in a drawing if the amendment constitutes a material alteration of the mark. Also, the mark in the drawing must agree with the mark as used on the specimens. The same standards which apply to use applications in determining whether specimens support use of the mark and in determining whether amendments can be permitted apply in the examination of the statement of use.

Therefore, in an intent-to-use application, the examining attorney must require amendment to the mark or the submission of new specimens if the mark in the drawing is not a substantially exact representation of the mark as used on the specimens. Trademark Rule 2.72(c), 37 C.F.R. Section 2.72(c). However, if amendment of the mark would constitute a material alteration of the mark in such a case, the examining attorney must require substitute specimens only. The same standards applied in use applications in determining whether the specimens support use of the applied-for mark apply to specimens in intent-to-use applications. *See* Examination Guide 2-89. *Cf. United Rum Merchants Ltd. v. Distillers Corp. (S.A.) Ltd.*, 9 USPQ2d 1481 (TTAB 1988).

If the applicant submits substitute specimens in conjunction with a statement of use, the applicant must verify that the substitute specimens were in use in commerce before the expiration of the time permitted to file the statement of use. Trademark Rule 2.59(b), 37 C.F.R. Section 2.59(b). If the dates

of first use change as a result of the submission of new specimens, the applicant must also amend the dates of first use in the statement of use with a supporting affidavit or declaration.

f. Consideration of the Specimens of Use in the Examination of the Statement of Use

Apart from the statement of use itself, the primary focus of examination of the statement of use is the specimens of use. The examining attorney must evaluate the specimens to confirm that the specimens exhibit appropriate use. Trademark Act Section 45, 15 U.S.C. Section 1127. The examining attorney must also examine the specimens to confirm that the specimens show use of the subject matter as a trademark or service mark on or in connection with the goods or services identified in the statement of use. The examining attorney will also consider any questions regarding ownership or control of the mark arising in the examination of the specimens. These issues are typical of those which are appropriate for action in examination of the statement of use. The examining attorney should issue requirements and refusals, as appropriate, based on the examination of the specimens, subject to the same standards which govern the examination of specimens in any other phase of examination. TMEP section 808.

10. Revival of Abandoned Intent-to-Use Applications

As noted below (B.13.), petitions to revive all abandoned applications must be filed promptly. Trademark Rule 2.66(d), 37 C.F.R. Section 2.66(d). Generally, a petition to revive should be filed within two months of abandonment. In any petition to revive an abandoned application, the applicant must show that the delay in responding was unavoidable. Delays due to circumstances which could have been avoided with the exercise of a modicum of care and attention will not be considered unavoidable delays.

In addition to the requirements which apply to all petitions to revive, a petition to revive an intent-to-use application, abandoned due to the failure to file the statement of use within the time allowed, is subject to additional requirements. The petition must include a fee equal to the required fees for the number of requests for extensions of time to file the statement of use which should have been filed if the application had not been abandoned *and* either a statement of use or a request for an extension of time. Trademark Rule 2.66(c), 37 C.F.R. Section 2.66(c).

The referenced fees are in addition to the standard petition and any statement of use fees. If an applicant has already filed a statement of use, the applicant need not file another statement of use with the petition. If a response to an outstanding Office action is due, the applicant must include that response with the petition.

However, the Office will not grant a petition to revive an intent-to-use application if the grant of the petition would extend the period for filing the statement of use beyond thirty-six months after issuance of the notice of allowance. Trademark Rule 2.66(d), 37 C.F.R. Section 2.66(d).

11. Assignment of Intent-to-Use Applications

The 1988 amendments to the Act provide as follows:

> However, no application to register a mark under section 1(b) shall be assignable prior to the filing of the verified statement of use under section 1(d), except to a successor to the business of the applicant, or portion thereof, to which the mark pertains, if that business is ongoing and existing.

Trademark Act Section 10, 15 U.S.C. Section 1060.

The Office will not examine proposed assignments to determine compliance with this provision as a general rule. However, the examining attorney will inquire to determine whether an assignment conforms to the requirements of this provision if the question is raised by the information of record. If the examining attorney issues an inquiry as to compliance, the applicant's response that the assignment was in compliance with the law is sufficient to resolve the issue.

As discussed in detail below (B.11.b.), the applicant bears the burden of recording and notifying appropriate Office personnel of assignments or changes of name to ensure that the registration issues in the name of a new owner. Trademark Rule 2.187, 37 C. F. R. Section 2.187.

12. Mailing Procedures and Fees Related to Intent-to-Use Applications

a. Use of the "Box ITU" designation

Applicants are encouraged to include "Box ITU" in the address when submitting the following:

i. statements of use under Section 1(d) of the Act, Trademark Rule 2.88, 37 C. F. R. Section 2.88, and

ii. requests for extensions of time to file statements of use under Trademark Rule 2.89, 37 C.F.R. Section 2.89.

Rule 1.1(h), 37 C. F. R. Section 1.1(h). Applicants should *not* use the "Box ITU" designation when filing the intent-to-use application itself, amendments to allege use or when filing routine responses to Offfice actions in intent-to-use applications because it may delay processing.

b. The Certificate-of-Mailing Procedure

The following intent-to-use papers are specifically excepted from the certificate-of-mailing procedure:

i. statements of use under Section 1(d) of the Act,

ii. requests for extensions of time to file statements of use under Trademark Rule 2.89, 37 C. F. R. Section 2.89, and

iii. amendments to allege use under Section 1(c) of the Act.

Rule 1.8(a), 37 C. F. R. Section 1.8(a). Also, the initial filing of all trademark applications, including intent-to-use applications, is excepted from this procedure. Thus, any of these papers will be considered filed on the date actually received or on the date specified under Rule 1.10, 37 C. F. R. Section 1.10, concerning the use of "Express Mail."

c. Fees Related to Intent-to-Use Applications

The filing fee for an intent-to-use application itself is $175.00 per class. The fee for filing an amendment to alleged use, statement of use or a request for an extension of time is $100.00 per class. Trademark Rule 2.6, 37 C. F. R. Section 2.6

B. PROVISIONS AFFECTING ALL APPLICATIONS

Certain changes in Office policy and procedure associated with the 1988 amendments and revisions to the rules affect all applications, that is, use applications under Tradfemark Act Section 1(a), 15 U. S. C. Section 1051(a), intent-to-use applications under Trademark Act Section 1(b), 15 U. S. C. Section 1051(b), as well as applications filed under Trademark Act Section 44, 15 U. S. C. Section 1126. Those changes will be set forth in this section.

1. Filing Date Requirements

Trademark Rule 2.21, 37 C. F. R. Section 2.21, sets forth the minimum requirements for receiving a filing date for all types of applications. These minimum requirements do not include all of the requirements which may ultimately apply for registration of the mark, but merely those formal requirements which must be met to receive a filing date.

a. Applicant's Signature

Under the rule, as revised, all applicants are required to provide a declaration or verification signed by the applicant to receive a filing date. Because the filing of an application for the Principal Register now establishes a constructive date of use,

contingent on issuance of a registration, under Trademark Act Section 7(c), 15 U.S.C. Section 1057(c), the rule now imposes this requirement.

If an application is submitted unsigned, the Application Section will not grant a filing date and will return the papers to the applicant. If an unsigned application reaches the examining attorney in error, the examining attorney should return the application to the Application Section for appropriate action.

Under Trademark Act Section 1, 15 U.S.C. Section 1051, only the following persons have statutory authority to sign: the individual in an application filed by an individual, a general partner in a partnership application or an officer in an application filed by a corporation or association.

If the applicant submits a signed declaration or verification, the examining attorney will determine whether the person who signed had authority to sign for the applicant under the Act. If the person did not, the applicant may submit a substitute declaration and retain the filing date, provided the person who signed initially possessed color of authority to sign. Persons having color of authority are those who have firsthand knowledge of the truth of the statements in the application *and* who also have actual or implied authority to act on behalf of the applicant. Trademark Rule 2.71(c), 37 C.F.R. Section 2.71(c).

For example, in the case of a corporate applicant, a nonofficer, such as a manager, who had the requisite knowledge of the facts relevant to the application and actual or implied authority to act on behalf of the applicant, would possess color of authority, though not proper authority under the Act. In such a case, a substitute declaration could be submitted during prosecution of the application to correct this defect. An attorney who is an employee of a corporation might also satisfy the criteria.

On the other hand, the applicant's private attorney would not ordinarily be regarded as possessing color of authority to sign on behalf of an applicant. Private attorneys do not usually have firsthand knowledge of a client's business or the authority to act on behalf of a client, other than as legal representative. Here, the defect could not be corrected by filing a substitute verification or declaration, confirming the facts in tha application, signed by an appropriate person. If the person who signed the application lacked even color of authority to sign on behalf of the applicant, the examining attorney must refuse registration because the application did not meet the requirements of Trademark Rule 2.21, 37 C.F.R Section 2.21, for receiving a filing date.

If the examining attorney determines that the person who signed for the applicant lacked the requisite authority, but the person possessed at least color of authority, the examining attorney will require a substitute declaration or verification.

The Office will accept copies of signed applications for the purpose of granting a filing date. Applicants cannot send copies of applications by fax directly to the Office, but the Office will accept copies which have been produced by fax in the same manner as any other copy. However, if a copy is filed, the applicant must provide the signed original copy of the application during prosecution. If the applicant has not done so earlier, the examining attorney will require that the applicant do so in the first action in the case. In no case will anything other than a certificate or certified copy of a foreign registration be accepted for purposes of granting a filing date in an application based on Trademark Act Section 44(e), 15 U.S.C. Section 1126(e).

b. Drawing Size

Effective July 3, 1989, the Office requires that drawings conform to the size requirements specified in Trademark Rule 2.52(c), 37 C.F.R. Section 2.52(c), to receive a filing date. If the mark in a special-form drawing is displayed in an area larger than four inches by four inches, it will be regarded as not being in substantial conformity with the rule and the application will be denied a filing date and returned to the applicant. If an examining attorney discovers an application with a drawing which does not conform to this requirement, the examining attorney should return the application to the Trademark Services Division for appropriate handling. It should not be examined.

Other changes relating to the minimum requirements for receiving a filing date which relate to specific types of applications are noted under the discussion of those specific types of applications.

2. Identifying the Applicant and Applicant's Address

Trademark Rule 2.33(a)(1)(ii), 37 C.F.R. Section 2.33(a)(1)(ii), has been revised to state the requirements related to identifying a partnership. The rule now specifies that the application must identify "the state or nation under the laws of which the partnership is organized." This revision merely reflects long-standing Office practice. The applicant must also provide the names of all general partners and their state or nation of incorporation or their citizenship, as appropriate.

Also, an individual applicant may provide either a business or residence address. Both addresses are no longer required.

3. Drawings

Trademark Rule 2.51(d), 37 C.F.R. Section 2.51(d), has been added to provide guidance concerning the nature of drawings in the case of certain unusual types of marks. The rule provides as follows:

> (d) Broken lines should be used in the drawing of a mark to show placement of the mark on the goods, or on the packaging, or to show matter not claimed as part of the mark, or both, as appropriate. In an application to register a mark with three-dimensional features, the drawing shall depict the mark in perspective in a single rendition.

This provision is intended to provide guidance to applicants wishing to register certain types of marks, such as configurations of goods or configurations of packaging for goods and similar marks. The provision brings the rules into conformity with current practice. The drawing should clearly define the matter the applicant claims as its mark. *See In re Famous Foods, Inc.*, 217 USPQ 177 (TTAB 1983). If the mark is three-dimensional, the drawing should present the mark in three dimensions. *In re Schaefer Marine, Inc.*, 223 USPQ 170 (TTAB 1984).

Trademark Rule 2.52(e), 37 C.F.R. Section 2.52(e), has been revised to simplify the color linings used to identify the colors orange and yellow or gold in drawings of marks. If an applicant employs the color linings formerly designated for these colors, the examining attorney should not require a new drawing. The revised rule has been adopted for the convenience of applicants, and the Office will allow a reasonable time for applicants to adjust to the new coding.

Trademark Rule 2.52(d), 37 CF.R. Section 2.52(d), has been amended to modify the content of the drawing heading. Specifically, it now requires that an applicant claiming the benefit of a foreign application under Trademark Act Section 44(d), 15 U.S.C. Section 1126(d), specify the priority date in the drawing heading. It also recommends that applicants provide, as a part of the heading, a description of the essential elements of the mark in the case of a special-form drawing.

4. Specimens - Requirements

Trademark Rules 2.56 and 2.57, 37 C.F.R. Sections 2.56 and 2.57, have been revised to reduce the number of specimens or facsimiles required in an application from five to three. In view of this rule, the public may remove only two surplus copies of specimens from the file permanently. At least one original of each type of specimen submitted must be retained in the file to ensure a complete record of the case. In the case of applications filed before November 16, 1989, the Office will not require more than three specimens per class in any action taken on or after that date.

The referenced rules have also been revised to reflect the provisions of the 1988 amendments revising Trademark Act Section 45, 15 U.S.C. Section 1127. Specifically, the definition of "use in commerce" has been revised to provide that when the nature of the goods makes placement of the mark on the goods, containers, tags, labels or displays associated with the goods impracticable, then placement of the mark on documents associated with the goods or their sale constitutes use in commerce. The referenced rules have been amended to reflect this change. *See In re E.A. Miller & Sons Packing Co.*, 225 USPQ 592 (TTAB 1985). Therefore, the examining attorney should accept documents associated with the goods or their sale, in the case of goods sold in bulk or in similar cases, where placement of the mark on the goods themselves is impracticable.

The referenced rules regarding specimens or facsimiles have also been revised to establish 8.5 by 11 inches as the maximum size permitted for such items. This revision brings the rule into conformity with the preferred size indicated for all filings and standards prevailing in federal practice in general.

5. Specimens - Examination

The 1988 amendments also revise the definition of "use in commerce" to adopt a stricter standard. The Act now states, "The term `use in commerce' means the bona fide use of a mark in the ordinary course of trade, and not merely to reserve a right in a mark." Trademark Act Section 45, 15 U.S.C. Section 1127. This stricter definition of "use in commerce" applies to all applications, affidavits of use and renewals filed on or after November 16, 1989. *Cf. Ralston Purina Company v. On-Cor Frozen Foods Inc.*, 746 F.2d 801, 223 USPQ 979 (Fed. Cir. 1984).

The Office will not inquire into the sufficiency of an applicant's or registrant's use in the examination of applications, amendments to allege use, statements of use, affidavits of use or renewals unless the specimens or other evidence of record clearly raise a question concerning the applicant's or registrant's use. The consideration of whether a particular use satisfies the statutory definition is more appropriate in an inter partes proceeding. The examining attorney should require new specimens generally under the same circumstances where the examining attorney would have required new specimens prior to the 1988 amendments. If the specimens appear to be temporary in nature, the examining attorney may require specimens of a more permanent nature.

Example —If an applicant seeks to register a mark suggesting a Christmas theme for greeting cards and submits as specimens birthday cards with an additional pasted label displaying the mark, the specimens could not be regarded as exhibiting "use in commerce." The examining attorney should refuse registration and require substitute specimens exhibiting use in commerce or an explanation to establish use in commerce.

When action is necessary, in appropriate cases, the examining attorney should require additional product or sales literature concerning the use of the mark to permit full consideration of the issue. Trademark Rule 2.61(b), 37 C.F.R. Section 2.61(b).

6. Identifications of Goods and Services

Trademark Rule 2.71, 37 C.F.R. Section 2.71, restricts amendments to the identification of goods or services as follows, "The identification of goods or services may be amended to clarify or limit the identification, but additions will not be permitted." Trademark Rule 2.71(b), 37 C.F.R. Section 2.71(b).

This rule applies to applications filed on or after November 16, 1989. The rule also applies to applications filed before November 16, 1989, for the purposes of any action taken on or after that date. However, if the Office issued a requirement or suggested an amendment in an action prior to that date, and the applicant submits an amendment substantially complying with the requirement or suggestion on or after the effective date, the examining attorney should accept the amendment, even though it does not comply with the new rule, if it is otherwise proper.

As noted previously, Trademark Act Section 7(c), 15 U.S.C. Section 1057(c), provides that the filing of any application for registration on the Principal Register establishes constructive use and nationwide priority contingent on issuance of the registration. The identification of goods and services in an application, therefore, defines the scope of those rights established by the filing of an application for the Principle Register. The following sections discuss identification of goods and services in general; additional information relevant to the identification of goods and services in an intent-to-use application is presented above with the specific discussion of such applications.

a. Limiting the Identification of Goods and Services

As indicated above, the rules permit amendments to limit the identification of goods and services. The rules also refer to "deletion" in relation to the identification of goods and services. *See, e.g.*, Trademark Rule 2.74, 37 C.F.R. Section 2.74."Deletion" means the elimination of an existing item in an identification of goods and servbices in its entirety. Deletion is distinct from other types of amendments to limit, such as amendments to limit the goods as to types, channels of trade or class of purchasers or to restrict an existing item in scope by the introduction of some qualifying language or the substitution of specific for more general terms.

Deletions from the identification of goods and services are permitted. If the applicant wishes to amend the identification of goods and services to delete one or more items, the examing attorney should accept the amendment, provided it is timely and otherwise proper. However, once the applicant has expressly amended the identification of goods and services to delete an item it may not be reinserted in a later amendment.

If an applicant wishes to amend the identification of goods and services to insert an item which is equivalent to or logically encompassed by an item already included in the identification of goods and services, the examining attorney should permit the amendment, provided it is timely and otherwise proper.

If the applicant wishes to amend the identification of goods and services to restrict one or more of the items by inserting qualifying language or substituting more specific language, the examining attorney should accept the amendment, provided it is timely and otherwise proper.

Example —If the applicant initially identifies the goods as "publications," the applicant may amend to substitute one or more terms which fall under the definition of publications. Likewise, if an applicant identifies its goods as "pamphlets," the applicant may amend to indicate brochures or both because these terms are generally equivalent and interchangeable. In either case, the applicant must specify the subject matter.

Example — If the Applicant initially identifies the goods as "football uniforms, " the applicant may amend to indicate football uniforms in Class 25 and football helmets and shoulder pads in Class 28. These goods are logically included within the initial identification. Footballs, however, could not be added; this would add an item not logically included within the original identification.

Example — If the applicant initially identifies the services as "prepaid medical services" and wishes to amend to underwriting prepaid medical plans and health care services in the nature of a health maintenance organization, the amendment should be permitted. Both specific services are logically included under prepaid medical services.

On the other hand, an applicant may not amend an identification of goods or services to add or substitute a term which is not logically included within the scope of the terms originally stated or which is otherwise qualitatively different from the goods and services as originally stated.

Example —If the applicant identifies the goods as "computer programs," the applicant may not add or substitute computers or other types of computer hardware to the listing.

Example — If the applicant initially identifies the goods as "hats," the applicant may not add or substitute scarfs in the identification of goods. Likewise, the applicant may not add or substitute shirts for slacks.

Example — If the applicant identifies its services as "ophthalmologist's services" and proposes to amend the identification to medical services, the amendment should not be permitted. The amendment would expand the identification to include services beyond the scope of those identified initially.

The scope of the goods and services, as originally identified or as amended by an express amendment, establishes the outer limit for any later amendments.

Because the rule precludes additions to the identification of goods and services, examining attorneys should not require or suggest unduly restrictive identifications of goods and services. *See In re Sentry Chemical Company*, 230 USPQ 556 (TTAB 1986). Once the identification has been limited, it cannot be expanded later. Also, in requiring amendments to the identification of goods and services, examining attorneys should generally advise applicants that additions to the identification of goods and services are not permitted. This subject is discussed in greater detail above in conjunction with intent-to-use applications.

b. Clarifying the Identification of Goods and Services

Under the rule, an applicant may amend "to clarify" the identification of goods and services. The applicant may clarify an identification of goods and services which is indefinite or overly broad to identify goods or services which are within the scope of the goods and services as identified initially. As noted, the filing of an application for registration on the Principal Register establishes a constructive date of first use in commerce, contingent on issuance of the registration. Trademark Act Section 7, 15 U.S.C. Section 1057. Accordingly, the applicant may not expand those rights through amendment of the identification of goods and services.

Thus the applicant may amend from the more general to the specific, but the applicant may not amend the specific to the more general. The scope of the goods and services identified initially, or as limited by an express amendment, establishes the outer limit for permissible amendments. Classification may provide some guidance in determining whether an amendment exceeds the scope of the goods and services identified initially, but it is not controlling. The examining attorney may suggest and may permit amendments to the identification of goods and services resulting in a change of class, provided the amended identification does not exceed the scope of the original identification.

Example — If an applicant has erroneously identified its goods and services as "menus," but in fact, the applicant intends to register the mark for restaurant services, the applicant may not amend the identification of goods to "restaurant services." In such a case, the original identification, which is specific and narrow in scope, may not be expanded to services beyond the scope of that identification.

Example — If an applicant has erroneously identified its goods and services as "packaging and labels," but in fact, the applicant intends to register the mark for toys, the applicant may not amend to correct the identification. The initial identification failed to indicate the nature of the applicant's goods and services in any form, and therefore, the examining attorney must reject the amendment to insert an identification of goods and services beyond the scope of those stated initially.

Example — If an applicant has identified its goods and services as "advertising and business" the appplicant may not amend to specific goods or to services other than those within the scope of these terms, generally those services included in International Class 35.

7. Claims of Acquired Distinctiveness

The 1988 amendments revise Trademark Act Section 2(f), 15 U.S.C. Section 1052(f), to permit the filing of a prima facie showing of acquired distinctiveness based on five years use running up to the date the claim is made. The Act now states:

> The Commissioner may accept as prima facie evidence that the mark has become distinctive, as used on or in connection with the applicant's goods in commerce, proof of substantially exclusive and continuous use thereof as a mark by the applicant in commerce for the five years before the date on which the claim of distinctiveness is made.

Trademark Act Section 2(f), 15 U.S.C. Section 1052(f).

The Act previously required that the relevant five-year period precede the filing date of the application. Under the new provision, therefore, any five-year claim submitted on or after November 16, 1989, is subject to the new time period. This will apply even if the application was filed before November 16, 1989. *See* Trademark Rule 2.41(b), 37 C.F.R. Section 2.41(b). Note the discussion above concerning claims of acquired distinctiveness in intent-to-use applications (A.3.f.).

8. Supplemental Register

The 1988 amendments eliminate the one-year- lawful-use requirement for eligibility for the Supplemental Register. Therefore, on or after November 16, 1989, an applicant may apply for registration on the Supplemental Register at any time after commencing use of the mark. Likewise, on or after November 16, 1989, an applicant may amend a pending application to seek registration on the Supplemental Register at any time after use of the mark has commenced. The applicant may do so even if the original application for the Principal Register was filed before November 16, 1989. *See* Trademark Rule 2.47, 37 C.F.R. Section 2.47. However, if the application was filed before November 16, 1989, and the applicant had not used the mark in commerce for one year before the filing date, and the applicant amends to the Supplemental Register on or after November 16, 1989, the date of the amendment to the Supplemental Register becomes the effective filing date of the application.

As noted above (A.3.g.), an intent-to-use applicant may file an amendment to the Supplemental Register only after use has commenced and after the filing of an acceptable amendment to allege use or a statement of use. In such a case, the effective filing date of the application will be changed to the date on which the applicant filed the amendment to allege use under Section 1(c) of the Act or the statement of use under Section 1(d) of the Act.

In requesting registration on the Supplemental Register in either the original application or in an amendment to the Supplemental Register, the applicant need not include an additional statement as to lawful use. Although Section 23 still includes an explicit reference to lawful use, any use which is the basis for an application on either the Principal or the Supplemental Register must be lawful. It need not be stated explicitly.

In an application under Section 44 of the Act, the applicant may seek registration on the Supplemental Register without alleging lawful use in commerce and without alleging use anywhere in the world. Trademark Rule 2.47(b), 37 C.F.R. Section 2.47(b).

The 1988 amendments also add the following language to Trademark Act Section 27, 15 U.S.C. Section 1095, "Registration of a mark on the Supplemental Register shall not constitute an admission that the mark has not acquired distinctiveness." Examining attorneys, therefore, should note this provision in presenting any refusals or requirements related to the nondistinctive character of a mark previously registered on the Supplemental Register.

9. Affidavits of Use under Section 8

The 1988 amendments modify the requirements for the content of an affidavit of use which must be filed between the fifth and sixth anniversaries of registration. Trademark Act Section 8, 15 U.S.C. Section 1058. Under the new provision, the registrant must identify the specific goods or services on or in connection with which the mark is in use in commerce. Similarly, if the registrant elects to present an explanation of excusable nonuse, this explanation must also relate to specific goods or services.

Formerly, the allegation of use in commerce related to one or more classes with no requirement to specify the goods or services within a class on or in connection with which the mark was in use. If the registrant fails to provide an allegation of use or a satisfactory explanation as to nonuse as to any goods or services in the registration, those goods or services will be cancelled from the registration. If the original affidavit of use fails to specify the goods and services, the registrant may not amend the affidavit to correct this omission after the expiration of the period during which the affidavit is due. The registrant

may incorporate the goods and services by reference. For example, the registrant may state, "those goods and services specified in the registration" or "those goods and services specified in the registration except. . ." specifying any goods or services to be deleted.

The new provision also explicitly requires specimens of use to support the affidavit. Formerly, the Act required a "showing" and the Trademark Rules of Practice required as follows, "The statement must be supported by evidence which shows that the mark is in use, and normally such evidence consists of a specimen or a facsimile specimen which is currently in use, or a statement of facts concerning use." In view of the 1988 amendments, the rules have been revised to specify that specimens or facsimiles are required. Trademark Rules 2.161 and 2.162, 37 C.F.R. Sections 2.161 and 2.162.

Specimens of use must be provided before the expiration of the sixth year following registration. If the registrant fails to do so, the registration will be cancelled. If the registrant does provide specimens, but the Office determines that those specimens are unacceptable, the Office will require substitute specimens. In such a case, the registrant must provide specimens of use within the time provided. Substitute specimens may be filed after the expiration of the sixth year. If the registrant fails to do so, the registration will be cancelled. The registrant must also verify in an affidavit or a declaration under Trademark Rule 2.20, 37 C.F.R. Section 2.20, that the substitute specimens were in use in commerce before the expiration of the sixth year following registration.

Registrants filing affidavits under Section 8 should also note the revised rule concerning the establishment of ownership. Trademark Rule 2.186, 37 C.F.R. Section 2.186, permits a registrant to establish ownership either by recording an assignment in the Assignment Branch of the Office or by submitting proof of the assignment without recording.

10. Term and Renewal

The 1988 amendments reduce the registration and renewal term from twenty to ten years. Trademark Act Sections 8(a) and 9, 15 U.S.C. Sections 1058(a) and 1059. Accordingly, registrations issued on or after November 16, 1989, will be issued for ten-year periods and subject to renewal for ten-year periods. Registrations issued prior to that date remain in force for their existing term of twenty years, but are subject to renewal for ten-year periods. Trademark Rule 2.181, 37 C.F.R. Section 2.181. For the purpose of determining the relevant renewal period, the Office will adhere to the following policy during the transition.

i. If the registration expires on or after November 16, 1989, the registration will be renewed for ten years. The Office will not take final action to grant any such renewal until November 16, 1989.
ii. If the registration expires before November 16, 1989, and the Office takes final action to grant the renewal before that date, the registration will be renewed for twenty years.
iii. If the registration expires before November 16, 1989, and the Office takes final action to grant the renewal on or after November 16, 1989, the registration will be renewed for ten years.

All renewal terms run from the expiration date of the previous term.

Note Trademark Rule 2.186, 37 C.F.R. Section 2.186, regarding requirements related to the establishment of ownership of the registration for the purpose of renewals which permits a registrant to establish ownership either by recording an assignment in the Assignments Branch of the Office or by submitting proof of the assignment without recording.

11. Assignments

a. Content of Assignment Documents

Office policy governing trademark assignments provides that an assignment relating to an application or registration will be recorded, even if the assignment document itself does not identify the relevant application or registration numbers, provided certain conditions are met. Specifically, the policy requires as follows with respect to the identification of the properties assigned in such a case:

(i) The mark and the goods and services are identified in the assignment document (or the assignment is of all registrations and/or applications owned by the assignor), and the application or registration is identified by number and date in a transmittal letter or attachment to the assignment document, in which case, such letter or attachment shall become part of the record of the assignment; or

(ii) An assignment is executed concurrently with or subsequent to the filing of an application but before its serial number and filing date are ascertained, and the application is identified by its date of execution, name of the applicant, mark and goods or services.

b. Issuance of Registration in Current Owner's Name

Trademark Rule 2.187, 37 C.F.R. Section 2.187, has also been revised to clarify Office policy concerning issuance of registrations in the name of assignees or in a new name of the applicant. The rule provides as follows:

The certificate of registration may be issued to the assignee of the applicant, or in a new name of applicant, provided that the party makes a written request in the application record, by the time the application is being prepared for issuance of the certificate of registration, and an appropriate document is of record in the Assignment Search Room of the Patent and Trademark Office. If the assignment or name change document is not of record in the Assignment Search Room, then the written request must state that the document has been filed for recordation. The address of the assignee must be made of record in the application file and in the recorded document.

Trademark Rule 2.187, 37 C.F.R. Section 2.187.

Any application where such a request has been submitted should be forwarded to the assigned examining attorney. The assigned examining attorney will ensure that the assignment or change of name is entered in the file after recording and will then return the application to processing.

If a party other than the applicant of record attempts to take any action in a case, the examining attorney must confirm that the new party is the owner in accordance with Trademark Rule 2.186, 37 C.F.R. Section 2.186. That is, the applicant must provide the reel and frame number of an assignment, or the applicant must submit other evidence of ownership.

c. Assignment Fees

Applicants should note that, effective April 17, 1989, the fee for recording assignments of trademarks is $8.00 per application or registration assigned. Trademark Rule 2.6, 37 C.F.R. Section 2.6.

12. Establishing Ownership of Applications or Registrations

Trademark Rule 2.186, 37 C.F.R. Section 2.186, as amended, provides:

Any action with respect to an assigned application or registration which may or must be taken by an applicant or registrant may be taken by the assignee provided that the assignment has been recorded or that proof of the assignment has been submitted.

The previous rule required recording of an assignment in a case where the applicant/assignee or registrant/assignee was required to take an action, such as filing a response to an Office action, filing an affidavit of use under Trademark Act Section 8 or filing a renewal. While it may be advisable for an applicant or registrant to record an assignment of an application or registration in view of the provisions of Trademark Act Section 10, 15 U.S.C. Section 1060, concerning subsequent purchasers, neither the Act nor the rules require recordation.

However, if the party taking the relevant action with respect to the application or registration is different from the applicant or registrant of record and the filing party has not recorded an assignment, the party taking the action must establish that it is the owner of the application or registration through appropriate evidence. This evidence may consist of a copy of a document transferring ownership from one party to another or an explanation in an affidavit or supported by a declaration under Trademark Rule 2.20, 37 C.F.R. Section 2.20, that a valid transfer of legal title has occurred.

13. Revival of Abandoned Applications

Trademark Rule 2.66, 37 C.F.R. Section 2.66, concerning petitions to revive abandoned applications, requires that all such petitions be filed "promptly." The Office will continue to consider each petition on the merits according to the circumstances of the case, but, as a general rule, all such petitions should be filed within two months of the abandonment date. The standard for granting a petition to revive continues to be "unavoidable delay." Please note the discussion above (A.10.) with specific reference to petitions to revive intent-to-use applications.

14. Concurrent Use

The 1988 amendments insert the following language in Trademark Act Section 2(d), 15 U.S.C. Section 1052(d), governing concurrent use applications which are subject to concurrent use proceedings in the Patent and Trademark Office:

> Use prior to the filing date of any pending application or a registration shall not be required when the owner of such application or registration consents to the grant of a concurrent registration to the applicant.

The statute now provides greater flexibility to applicants seeking concurrent use registrations. Therefore, if the applicant is not entitled to a concurrent use registration on the basis of the jurisdictional requirement of use of its mark prior to the earliest filing date of any relevant pending application or registration, but the relevant prior applicant or registrant has consented to the applicant's concurrent use application, the examining attorney should approve the mark for publication, subject to a concurrent use proceeding, provided it is otherwise eligible.

Also, Trademark Rule 2.42, 37 C.F.R. Section 2.42, no longer requires that the stated exceptions in a concurrent use application be inserted in the verification or declaration. The exceptions need only be provided in the statement portion of the application.

15.Requests to Divide an Application

Trademark Rule 2.87, 37 C.F.R. Section 2.87, establishes procedures for dividing one application into two separate applications. The rule provides as follows:

> (a) An application may be physically divided into two or more separate applications upon submission by the applicant of a request therefor, in accordance with paragraph (c) of this section. In the case of a request to divide out some, but not all, of the goods or services in a class, a fee for each new separate application to be created by the division must be submitted. Any outstanding time period for action by the applicant in the original application at the time of the division will be applicable to each new separate application created by the division.
>
> (b) A request to divide an application may be filed at any time between the filing of the application and the date the Trademark Examining Attorney approves the mark for publication or the date of expiration of the six-month response period after issuance of a final action; or during an opposition, upon motion granted by the Trademark Trial and Appeal Board. Additionally, a request to divide an application under section 1(b) of the Act may be filed with a statement of use under section 2.88 or at any time between the filing of a statement of use and the date the Trademark Examining Attorney approves the mark for registration or the date of expiration of the six-month response period after issuance of a final action.
>
> (c) A request to divide an application should be made in a separate paper from any other amendment or response in the application. The title "Request to divide application." should appear at the top of the first page of the paper.

By dividing the application, the applicant preserves the filing date, and thus the potential constructive use date, as to all of the goods and services covered by the application.

Under the rule, the applicant may request that certain goods or services in a single class be divided, that is, that a separate application with the same filing date be created to cover those goods or services. The applicant may also request that an entire class or several classes be divided, that is, that one or more separate applications with the same filing date be created to cover certain classes.

An applicant may request division of an application for any reason. For example, in an intent-to-use application, the applicant may wish to proceed to publication or registration with certain goods and services on or in connection with which it has used the mark in commerce and retain an active application for any remaining goods or services. The applicant can do so by requesting division of the application.

If the applicant requests that the goods or services in a single class be divided into one or more separate applications, the applicant must submit an application fee for each new application to be created. The fee is the same as the fee for the filing of a new single-class application, $175.00. If an entire class is to be divided out from a multiple class application, there is no fee. Trademark Rule 2.87(a), 37 C.F.R. Section 2.87(a). There is no fee for the request to divide itself.

a. Processing Requests to Divide

Specially designated personnel in the ITU Unit will process all requests to divide. All requests to divide will be given priority in processing over any other paper in the case. All requests to divide should be forwarded to the ITU Unit immediately for processing. However, if the application is the subject of a proceeding before the Trademark Trial and Appeal Board, the request should first be forwarded to the Board for appropriate action. The ITU Unit will process the request as promptly as possible and will return the application or applications to regular processing after completing action on the request to divide.

If the request to divide does not include a necessary fee or is otherwise deficient, the ITU Unit will notify the applicant of the deficiency. The applicant must correct any such deficiency within thirty days or, if the division is a necessary component of a statement of use, within the time permitted for filing the statement of use, whichever is shorter. If the applicant fails to correct the deficiency within the time provided, the request will be considered abandoned and the application will be processed without regard to the request. The ITU Unit will advise the applicant of any such action and will refund any fees paid in conjunction with the request to divide.

If the applicant submits a request to divide along with a statement of use and a request for an extension of time, and the fees are insufficient to cover all three, the fees will be applied first to the request for an extension of time, second to the statement of use and lastly to the request to divide.

If the applicant submits a request to divide along with a statement of use, and the fees are sufficient for the statement of use only, and no time remains for filing additional fees, the applicant will be given the opportunity to amend the statement of use to include all goods or services in the application. The applicant must establish that the applicant used the mark in commerce on or in connection with all such goods or services within the time permitted for filing the statement of use. If time does remain in the existing period for filing the statement of use, the applicant will be permitted to submit the additional fees within that time period.

Filing a request to divide an application does not relieve an applicant of the duty to respond to any outstanding Office action or to take any other required action.

Likewise, the applicant should note that any outstanding time period for action by the applicant in effect at the time the

application is divided applies not only to the original application, but also to each new application created in the division of the application. Therefore, if a response to an Office action is due in a case, the response is due likewise in each new application created through the division of the application.

Similarly, if a statement of use is due, the period for filing the statement of use relevant to the original application is likewise relevant to each new application created through the division.

If a request to divide an application is received at any time other than those specified, it will be returned to the applicant with any fees submitted for that purpose and the application will not be divided.

The Office will not consider a request to merge two separate applications into a single application once again after a proper request to divide has been granted.

b. Division of Registration Not Permitted

A registration cannot be divided into one or more separate registrations.

16. Correspondence with Applicants Not Domiciled in the United States

Trademark Rule 2.18, 37 C.F.R. Section 2.18, has been revised to clarify Office policy with respect to correspondence with applicants not domiciled in the United States. In such a case, the Office will send correspondence to the applicant's domestic representative unless the applicant has authorized an attorney or another qualified person to prosecute the application. If the applicant has authorized an attorney or other qualified person to prosecute the application, the Office will send correspondence to that authorized person.

17. Preferred Size for Application Papers

Trademark Rule 2.31, 37 C.F.R. Section 2.31, now specifies that the preferred size for application papers is letter size. This policy applies to all submissions related to all applications.

C. PROVISIONS AFFECTING APPLICATIONS UNDER SECTION 44 OF THE ACT

The 1988 amendments introduce relatively few changes affecting applications filed under Trademark Act Section 44, 15 U.S.C. Section 1126. The amended Rules of Practice incorporate changes dictated by decisions in the area and clarify Office policy related to the administration of Section 44 in other respects. The provisions are summarized in this section.

1. Filing-Date Requirements

As noted above (A.1.a.), the amended Rules of Practice institute a number of changes related to receipt of a filing date which affect all applications. This section addresses only those changes which relate specifically to applications under Section 44. Trademark Rule 2.21, 37 C.F.R. Section 2.21, sets forth the minimum formal requirements to receive a filing date for the various types of applications. These minimum requirements do not include all of the requirements which may apply to qualify for registration.

a. Statement of a Bona Fide Intention to Use the Mark in Commerce

The 1988 amendments require all applicants under Section 44 of the Act to allege a bona fide intention to use the mark in commerce, although use in commerce is not required as a condition to registration. Any application under either Section 44(d) or 44(e) of the Act must include such a statement to receive a filing date. Trademark Rule 2.21(a)(5)(ii) and (iii), 37 C.F.R. Section 2.21(a)(5)(ii) and (iii).

The Office will not presume that an application under Section 44 is also based on intent to use under Trademark Act Section 1(b), 15 U.S.C. Section 1051(b). If the applicant wishes to assert both bases, the applicant must indicate so specifically. If the applicant indicates that Section 44 is the basis, and nothing more, and the applicant fails to comply with the relevant Section 44 filing-date requirements, the applicant will be denied a filing date, even if the application includes a statement of a bona fide intention to use the mark in commerce.

b. Priority Claim or Certified Copy of a Foreign Registration

In the case of an application claiming the benefits of Section 44(d), the application must be filed in the U.S. within six months of the relevant foreign filing and must include a claim of the benefit of a prior foreign application to receive a filing date. Trademark Rule 2.21(a)(5)(iii), 37 C.F.R. Section 2.21(a)(5)(iii). Trademark Rule 2.39, 37 C.F.R. Section 2.39, sets forth the required content of such a claim, essentially, the filing date and country of the first regularly filed foreign application. The applicant should also indicate the serial number of that application, if it is available. The serial number is not required to receive a filing date, however.

In the case of an application under Section 44(e), the application must include a certification or certified copy of the foreign registration on which the United States application is based to receive a filing date. Trademark Rule 2.21(a)(5)(ii), 37 C.F.R. Section 2.21(a)(5)(ii). If the applicant submits any type of copy other than an original of a certified copy, the Office will not grant a filing date.

2. Statement of Dates of Use and Method of Use and Specimens Not Required

In any application under Section 44, the applicant need not state a date of first use anywhere, nor a date of first use in commerce, nor the method of use. Also, the applicant need not provide specimens of use. *Crocker National Bank v. Canadian Imperial Bank of Commerce*, 223 USPQ 909 (TTAB 1984). Trademark Rules 2.21 and 2.33, 37 C.F.R. Sections 2.21 and 2.33, have been amended to reflect this change. In such a case, the mark need not be in use anywhere for the purposes of the U.S. application.

3. The Basis for Registration in Applications Claiming the Benefits of Section 44(d)

In *In re Daiwa Seiko, Inc.*, 230 USPQ 794 (Comm'r Pats. 1983), the Commissioner clarified the distinction between Sections 44(d) and (e) of the Act. The Commissioner held that Section 44(d) only provides a basis for receiving a priority filing date but does not provide a basis for registration. Therefore, an application claiming the benefit of a foreign application under Section 44(d) must include a basis for registration also. In most cases, the basis for registration will be the foreign registration which will issue from the foreign application relied upon for priority. The Office will presume that this is the basis for registration in any application under Section 44(d) unless the applicant indicates otherwise.

Furthermore, the assertion of a different basis for registration more than six months after the filing of the foreign application, including reliance on a different foreign registration under Section 44(e), will result in the loss of the priority filing date under Section 44(d) of the Act. In such a case, the Office will change the filing date in the United States to the date on which the applicant perfects the new basis for registration by providing either a proper statement of dates of use in commerce, a proper assertion of an intent to use in commerce under Section 1(b) of the Act or a certificate or certified copy of a foreign registration. *See* TMEP section 706 and Chapter 1000.

In an application filed under Section 44 before November 16, 1989, the applicant may amend to add Section 1(b) as a basis for registration on or after that date. However, if the applicant has claimed priority under Section 44(d) in such a case, and the applicant drops the original basis for registration to rely on Section 1(b) only, the applicant may not retain the priority date unless the amendment asserting Section 1(b) as a basis for registration was made within six months of the filing of the foreign application relied on for priority. If the amendment was made later and the applicant drops the original basis for registration, the effective filing date of the application is the date of the amendment to assert Section 1(b) as a basis for registration.

D. PROVISIONS AFFECTING APPLICATIONS BASED ON USE IN COMMERCE ONLY

The 1988 amendments and the amended Rules of Practice do not provide any changes, as such, related specifically to applications based on use in commerce under Trademark Act

Section 1(a), 15 U.S.C. Section 1051(a), other than those noted above (Section B) affecting all applications. In one instance, noted here, the amended Rules of Practice merely set forth long-standing Office policy in the rules for the first time.

Trademark Rule 2.59(a), 37 C.F.R. Section 2.59(a), provides as follows:

> In an application under section 1(a) of the Act, the applicant may submit substitute specimens of the mark as used on or in connection with the goods, or in the sale or advertising of the services, provided that any substitute specimens submitted are supported by applicant's affidavit or declaration in accordance with Section 2.20 (37 C.F.R. Section 2.20) verifying that the substitute specimens were in use in commerce at least as early as the filing date of the application. The verification requirement shall not apply if the specimens are duplicates or facsimiles, such as photographs, of specimens already of record in the application.

As noted, this provision merely states long-standing policy in the regulations for the first time.

E. FILING ON MORE THAN ONE BASIS AND CHANGING THE BASIS OF THE APPLICATION

Trademark Rule 2.33(d), 37 C.F.R. Section 2.33(d), precludes the filing of an application based on both use in commerce under Trademark Act Section 1(a), 15 U.S.C. Section 1051(a), and a bona fide intention to use the mark in commerce under Trademark Act Section 1(b), 15 U.S.C. Section 1051(b). This prohibition precludes applications in a single class alleging both use in commerce and intent to use as to either the same goods and services or different goods or services. Likewise, the prohibition precludes applications in more than one class alleging both use in commerce and intent to use. If an applicant submits an application asserting both Section 1(a) and 1(b) bases for registration, the Office will not grant a filing date and will return the papers to the applicant.

The rule also precludes amendments in applications initially based on use in commerce under Section 1(a) to change the basis to intent to use under Section 1(b). In an application under Section 1(b) of the Act, an applicant may assert dates of first use which are earlier than the filing date of the application in an amendment to allege use or a statement of use.

Applicants may allege Section 44 as an additional basis for registration in conjunction with either use in commerce under Section 1(a) or intent to use under Section 1(b). In such a case, an applicant may also allege different bases for the application as to specific goods or services within a class. If an applicant asserts more than one basis for registration, the applicant must satisfy all of the requirements for registration which apply to each basis asserted. The applicant must indicate clearly that it asserts two bases for registration.

If an applicant asserts both intent to use and Section 44(e) as the bases for registration, the Office will not approve the mark for publication until the applicant submits a certificate or certified copy of the foreign registration.

In an application filed under Section 44 before November 16, 1989, the applicant may amend to add Section 1(b) as a basis for registration on or after that date. However, if the applicant has claimed priority under Section 44(d) in such a case, and the applicant drops the original basis for registration to rely on Section 1(b) only, the applicant may not retain the priority date unless the amendment asserting Section 1(b) as a basis for registration was made within six months of the filing of the foreign application relied on for priority. If the amendment was made later and the applicant drops the original basis for registration, the effective filing date of the application is the date of the amendment to assert Section 1(b) as a basis for registration.

PATENT NOTICES

Certificates of Correction For Week of November 21, 1989

D. 298,249	4,781,620	4,800,492	4,816,386
D. 299,786	4,782,221	4,801,423	4,816,601
D. 300,410	4,783,359	4,801,482	4,816,823
D. 300,577	4,784,098	4,801,581	4,817,324
PLT. 6,759	4,784,277	4,801,590	4,818,408
PLT. 6,812	4,784,315	4,801,814	4,818,543
4,086,384	4,784,788	4,802,269	4,818,631
4,491,577	4,784,882	4,802,744	4,819,153
4,550,573	4,785,182	4,802,907	4,819,246
4,559,247	4,785,336	4,803,069	4,819,346
4,595,619	4,785,942	4,803,142	4,819,858
4,641,676	4,786,240	4,804,279	4,820,281
4,642,674	4,786,573	4,804,382	4,820,548
4,658,341	4,786,671	4,804,554	4,821,173
4,659,662	4,786,693	4,804,576	4,821,239
4,687,775	4,787,165	4,804,599	4,821,940
4,690,940	4,787,801	4,806,594	4,822,649
4,698,152	4,787,930	4,806,847	4,822,840
4,701,175	4,788,208	4,806,916	4,822,959
4,702,108	4,788,645	4,807,043	4,823,280
4,704,114	4,788,957	4,807,600	4,823,324
4,709,367	4,790,225	4,807,879	4,823,783
4,718,403	4,791,045	4,807,894	4,824,044
4,725,292	4,791,077	4,808,209	4,824,081
4,745,189	4,792,174	4,809,265	4,824,104
4,748,265	4,792,547	4,809,417	4,824,945
4,754,897	4,793,857	4,809,764	4,825,093
4,754,987	4,794,070	4,809,982	4,825,523
4,755,836	4,795,453	4,810,201	4,825,752
4,756,421	4,795,510	4,810,886	4,828,325
4,760,180	4,795,960	4,811,371	4,829,124
4,763,199	4,797,146	4,811,416	4,829,186
4,763,896	4,797,162	4,811,800	4,829,469
4,765,052	4,797,171	4,812,346	4,831,182
4,770,298	4,797,273	4,812,431	4,831,455
4,771,294	4,797,586	4,813,055	4,831,708
4,773,269	4,797,819	4,813,151	4,832,929
4,775,330	4,798,562	4,813,417	4,833,093
4,775,606	4,798,705	4,813,419	4,833,190
4,776,422	4,798,840	4,813,905	4,833,291
4,776,849	4,798,988	4,813,950	4,834,447
4,776,975	4,799,055	4,814,106	4,838,057
4,777,260	4,799,419	4,814,248	4,839,051
4,778,894	4,800,303	4,815,444	4,841,037
4,780,457	4,800,348	4,815,744	4,847,519
4,780,999	4,800,382	4,815,940	

Erratum

In the Notice of Certificate of Correction Appearing at 1104 O. G. 35, delete Patent No. 4,776,442, the number was erroneously mentioned and should be deleted.

Disclaimer

4,649,209.—*Emil J. Geering*, Grand Island, N. Y. PROCESS FOR PREPARING METHYL CHLOROSULFATES. Patent dated Mar. 10. 1987. Disclaimer filed Aug. 25, 1989, by the assignee, Occidental Chemical Corporation.

Hereby enters this disclaimer to the entire term of said patent.

4,652,115.—*Charles S. Palm*, Norcross; *Danny L. Slayton*, Lilburn; *Khosrow Lak; Peter F. Sampson*, both of Doraville; *David R. Davis*, Buford; *Maurice S. Wheatley, Jr.*, Duluth; *Gregory A. Chatham*, Marietta; *Wayne C. Jones*, Duluth; *Kirk W. Charles*, Atlanta, all of Ga.; *Anthony J. Ireland*, El Cerrito, Calif. PRINT ENGINE FOR COLOR ELECTROPHOTOGRAPHY. Patent dated Mar. 24, 1987. Disclaimer filed Aug. 18, 1989, by the assignee, Colorocs Corp.

Hereby enters this disclaimer to claim 6 of said patent.

4,774,230.—*Ronald R. Tuttle*, Plantation; *Ross Dixon*, Boca Raton; *Maciej M. Smulkowski*, Gainesville, all of Fla. GLUCURONIC ACID DERIVATIVES OF OPIOID ANTAGONISTS. Patent dated Sept. 27, 1988. Disclaimer filed June 22, 1989, by the assignee, Baker Cummins Pharmaceuticals, Inc.

Hereby enters this disclaimer to claims 1 and 2 of said patent.

4,776,157.—*Ary van der Lely*, Maasland; *Cornelis J. G. Bom*, Rozenburg, both of the Netherlands. MACHINE FOR WORKING GRASS, HAY OR OTHER CROPS ON THE FIELD. Patent dated Oct. 11, 1988. Disclaimer filed Aug. 18, 1989, by the assignee, C. van der Lely, N. V.

Hereby enters this disclaimer to claims 6, 7, and 8 of said patent.

4,822,108.—*Michael D. Benhart*, Moline, Ill. ROW STRADDLING DUAL WHEELS FOR A HARVESTER. Patent dated Apr. 18, 1989. Disclaimer filed Aug. 28, 1989, by the assignee, Deere & Company.

Hereby enters this disclaimer to claims 5, 6, and 7 of said patent.

Disclaimer and Dedication

4,369,419.—*James I. Portscheller*, Sparland, Ill. SOLENOID HAVING SPRING BLASED LOST MOTION LINK. Patent dated Jan. 18, 1983. Disclaimer and Dedication filed Sept. 11, 1989, by the assignee, Caterpillar Inc.

Hereby disclaims and dedicates to the Public claims 1-12 of said patent.

4,466,106.—*Arthur L. Serrano*, Canoga Park, Calif. FREQUENCY SHIFT KEYED MODEM CHIP SET. Patent dated Aug. 14, 1984. Disclaimer and Dedication filed Aug. 28, 1989., by the assignee, Practical Peripherals, Inc.

Hereby disclaims and dedicates to the Public the entire term of said patent.

4,544,468.—*Wolf D. Munz*, Somborn; *Gerhard Hessbeger*, Karlstein, both of Fed. Rep. of Germany. METHOD OF AND APPARATUS FOR COATING SHAPED PARTS BY CATHODIC ATOMIZTION. Patent dated Oct. 1, 1985. Disclaimer and Dedication filed Jun. 12, 1989, by the assignee, Leybold Aktiengesellschaft.

Hereby disclaims and dedicates to the Public the entire term of said patent.

SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

The following special boxes should be used only for their specified purpose. Address mail as follows:

Box _____
Commissioner of Patents and Trademarks
Washington, D.C. 20231

Box 3	Mail for the Office of Personnel from NFC.
Box 4	Mail for the Assistant Commissioner for External Affairs and the Office of Legislation and International Affairs.
Box 5	"No fee" mail related to trademarks.
Box 6	Mail for the Office of Procurement.
Box 7	Reissue applications for patents involved in litigation and subsequently filed related papers.
Box 8	All papers for the Office of the Solicitor except communications relating to pending litigation.
Box 9	Coupon orders for U.S. patent and trademark copies.
Box 10	Orders for certified copies of patent and trademark applications.
Box 11	Electronic Ordering Service (EOS).
Box 12	Contributions to the Examiner Education Program.
Box 13	Mail for the Employee and Labor Relations Division.
Box AF	Expedited procedure for processing amendments and other responses after final rejection.
Box FWC	Requests for File Wrapper Continuation Applications.
Box Interference	Communications relating to interferences and applications and patents involved in interference.
Box Issue Fee	All communications following the receipt of a PTOL-85, "Notice of Allowance and Issue Fee Due," and prior to the issuance of a patent should be addressed to Box Issue Fee, unless advised to the contrary. Assignments are the exception. Assignments should be submitted in a separate envelope and not be sent to Box Issue.
Box M. Fee	Correspondence related to a patent that is subject to the payment of a maintenance fee.
Box Non Fee Amendment	Non-fee amendments to patent applications. (Use Box AF for responses after final rejection.)
Box OED	Mail for the Office of Enrollment and Discipline.
Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Mail related to Reexamination.
Box SN	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent application *prior* to the Office's standard notification (return post card or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").
PATENT APPLICATION	New patent application and associated papers and fees.
TRADEMARK APPLICATION	New trademark application and associated papers and fees.
Box Assignments	All assignment documents except those filed in new patent applications.

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PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF October 7, 1989

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	5-26-87
ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director	6-16-87
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	4-15-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	5-14-87
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director	9-10-86
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director	9-24-87
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COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260 S. LEVY, Acting Director	8-17-87
DESIGN, GROUP 290—K. L. CAGE, Director	2-6-86
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	5-18-88
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director	4-13-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	4-20-87
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	2-26-88
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	1-3-89

Expiration of patents: The patents within the range of numbers indicated below expire during October 1989, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,694,814 to 3,702,011 inclusive
Plant Patents ..... None

REEXAMINATIONS

NOVEMBER 21, 1989

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,503,095 (1159th)

HEAT-SENSITIVE COLOR TRANSFER RECORDING MEDIA

Tadao Seto, Matsudo, and Yoshikazu Shimazaki, Osaka, both of Japan, assignors to Fuji Kagakushi Kogyo Co., Ltd., Osaka, Japan

Reexamination Request Nos. 90/001,303, Aug. 7, 1987 and 90/001,655, Dec. 1, 1988.

Reexamination Certificate for Patent No. 4,503,095, issued Mar. 5, 1985, Ser. No. 465,017, Feb. 8, 1983.

Filed Dec. 1, 1988, Ser. No. 465,017

Claims priority, application Japan, Feb. 13, 1982, 57-21571; Feb. 13, 1982, 57-21572

Int. Cl.[4] B41M *5/26*

U.S. Cl. 427—265

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim **2** is cancelled.

Claims **1** and **3–10** are determined to be patentable as amended.

New claims **11–27** are added and determined to be patentable.

1. A heat-sensitive color transfer recording media comprising a continuous foundation and a multiplicity of coated areas of heat-sensitive transfer inks applied onto the foundation; the multiplicity of the coated area being disposed on the continuous foundation side by side so as to traverse the continuous foundation; the multiplicity of the coated areas being arranged sequentally in the longitudinal direction of the continuous foundation in a repeating unit which comprises a plurality of [different] color coated areas *of yellow, magenta and cyan*; each of the [different] color coated areas included in the repeating unit having a length in the longitudinal direction of the continuous foundation substantially equal to the length or width of a copy sheet; each of the heat-sensitive transfer ink layers of the *color* coated areas *of yellow, magenta and cyan* being a transparent ink layer comprising a transparent coloring agent and a transparent hot-melt vehicle *and having a visible light transmittance of not less than 68%*; and said plurality of the [different] color heat-sensitive transfer ink layers of the coated areas of the recording media being *capable of being* transferred onto the copy sheet so that different color ink images are superimposed on the copy sheet *without substantially admixing with each other* to give a color image.

REISSUES

NOVEMBER 21, 1989

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

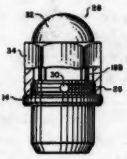
Re. 33,114
TAMPER-PROOF THREADED FASTENINGS

Ezio R. Chiavon, 17 Walnut La., Harrison, N.Y. 10528

Original No. 4,616,535, dated Oct. 14, 1986, Ser. No. 754,064, Jul. 11, 1985. Continuation of Ser. No. 476,031, Mar. 17, 1983, abandoned. Application for reissue Sep. 22, 1988, Ser. No. 247,751

Int. Cl.[4] B25B *13/06*

U.S. Cl. 81—121.1 **22 Claims**



1. An anti-theft fastening device for securing an automobile wheel to a vehicle, said fastening device including a head portion defining a predetermined configuration on the outer periphery thereof adapted to complement the configuration of a tool for removing said head portion from an automobile wheel, and a cap [removable] *removably* mounted over said head portion to conceal said predetermined configuration defined on said head portion, the combined weight of *the fastening device including* said head portion and said cap being substantially equal in weight to the weight of conventional lug nuts mounted to said automobile wheel.

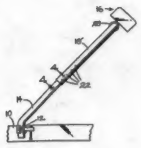
Re. 33,115
ACCOUCHEMENT APPARATUS

Julie M. Lewis, 18050 S. Skylands Cir., Lake Oswego, Oreg. 97034

Original No. 4,715,592, dated Dec. 29, 1987, Ser. No. 910,802, Sep. 22, 1986. Continuation of Ser. No. 806,124, Dec. 6, 1985, abandoned, which is a continuation of Ser. No. 612,321, May 21, 1984, abandoned. Application for reissue Aug. 1, 1988, Ser. No. 232,461

Int. Cl.[4] A61G *13/00*

U.S. Cl. 269—328 **6 Claims**



6. Accouchement apparatus for disposition on an underlying horizontal support, the accouchement apparatus configured to engage and support the vertically extending upper body of a woman kneeling or squatting on the underlying horizontal support, for supporting the woman in an upright position on the underlying horizontal support during labor and delivery, the accouchement apparatus comprising:

(a) a U-shaped frame having an intermediate horizontal upper body support portion and laterally spaced vertically extending legs of sufficient length to position said horizontal upper body support portion above an underlying horizontal support a distance sufficient to support the vertical extending upper body of a woman kneeling or squatting on the underlying horizontal support with the arms of the woman hanging over said horizontal upper body support portion,

(b) a resilient pad secured to the intermediate upper body support portion of the frame for engagement by the vertically extending upper body of a woman kneeling or squatting on the underlying horizontal support and leaning against the padded upper body support portion for support in an upright position during labor and delivery, and

(c) means on the legs for engaging an underlying horizontal support to support the frame in vertically extending position with the resilient upper body support pad disposed substantially horizontally a spaced distance above the underlying horizontal support sufficient to engage and support the vertically extending upper body of a woman kneeling or squatting on the underlying horizontal support for the woman in upright position leaning against the padded upper body support portion during labor and delivery.

Re. 33,116
SINGLE-STAGE OILLESS SCREW COMPRESSOR SYSTEM

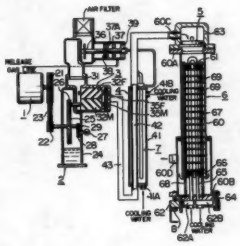
Akira Suzuki, Atsugi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Original No. 45,293,636, dated Jul. 16, 1985, Ser. No. 563,037, Dec. 19, 1983. Application for reissue Sep. 11, 1986, Ser. No. 905,957

Claims priority, application Japan, Sep. 12, 1983, 58-166644

Int. Cl.[4] F04B *49/00;* **F01C** *1/08*

U.S. Cl. 417—295 **19 Claims**



9. A single-stage oilless screw compressor system comprising:

a drive unit;

transmission means connected to said drive unit for increasing a rotational speed thereof;

a single-stage oilless screw compressor connected to said transmission means and having a pressure discharge pressure to suction ratio of over four, said single-stage oilless screw compressor comprising a casing formed with a suction port and a discharge port, a pair of screw rotors rotatably located in said casing and meshing with each other, bearing means supporting said pair of screw rotors, seal means interposed between said casing and shafts of said pair of screw rotors, and synchronizing gear means mounted on said pair of screw rotors for bringing about synchronization of their rotations;

a precooler connected to a discharge side of said single-stage oilless screw compressor, said precooler comprising a heat transfer tube and a shell enclosing said heat transfer tube;

a cooler connected to an outlet side of said precooler, said cooler

comprising a heat transfer tube and a shell enclosing said heat transfer tube; and

a check valve located in a compressed gas passage between said precooler and cooler.

Re. 33,117

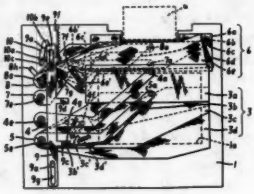
FOCAL PLANE SHUTTER FOR CAMERAS

Eiichi Onda, Yamanashi, and Masanori Watanabe, Narashino, both of Japan, assignors to Seiko Koki Kabushiki Kaisha, Tokyo, Japan

Original No. 40,965,05, dated Jun. 20, 1978, Ser. No. 713,591, Aug. 11, 1976. Continuation-in-part of Ser. No. 686,501, May 14, 1976, abandoned. Application for reissue Dec. 6, 1984, Ser. No. 679,036

Int. Cl.[4] G03B *9/36*

U.S. Cl. 354—246 **8 Claims**



1. A camera shutter mechanism *for a camera having a view finder*for opening and closing a shutter aperture to effect an exposure comprising: *a base plate having therein a shutter aperture, the base plate having a vertical height dimension and a horizontal width dimension and having a widthwise extending recess at the upper part thereof at a location vertically above the shutter aperture, the recess being dimensioned to accommodate therein the lower part of the view finder;*a group of opening blades movable, when released, from a closed *charged*position in which they cover the shutter aperture to an open position in which they do not cover the shutter aperture to initiate an exposure, *said group of opening blades being arranged to be stowed in a space provided in the lower part of the camera;*a group of closing blades movable, when released, from an open *charged*position in which they do not cover the shutter aperture to a closed position in [with] *which* they cover the shutter aperture to terminate the exposure, *said group of closing blades being arranged to be stowed in a space provided in the upper part of the camera beneath the view finder such that the stowed closing blades do not obstruct the optical path of the view finder; said group of opening blades having better light-shielding effectiveness than said group of closing blades when in the closed position;*release means for releasing the opening blades thereby enabling them to move to the open position for initiating the exposure, and for subsequently releasing the closing blades thereby enabling them to move to the closed position for terminating the exposure; and means including a driving member automatically operable immediately after completion of the exposure for moving the group of opening blades back towards the closed position so that the aperture is at least partially covered thereby *so that after termination of the exposure, though before charging of the shutter, the aperture is at least partially covered by the opening blade group which has better light-shielding effectiveness than the closing blade group.*

PLANT PATENTS

GRANTED NOVEMBER 21, 1989

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,057

AFRICAN VIOLET PLANT NAMED FARRAH

Reinhold Holtkamp, Sr., Werther Strasse 112, D4294 Isselburg, Fed. Rep. of Germany

Filed Oct. 26, 1988, Ser. No. 262,594
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—69 1 Claim

1. A new and distinct cultivar of African violet named Farrah, as described and illustrated, and particularly characterized by its single, dark pink flowers with slightly wavy edges and a darker center radiating somewhat into the petals; strong, upright flower stems that curve toward the center to form a compact bouquet above the leaves; dark green slightly serrated leaves; profuse flowering; vigorous growth habit flowering 10–11 weeks after potting, and its long lasting and non-dropping flowers.

7,058

MINIATURE ROSE PLANT NAMED SAVACHAS

F. Harmon Saville, Newburyport, Mass., assignor to Nor'East Miniature Roses, Inc., Rowley, Mass.

Filed Sep. 12, 1988, Ser. No. 242,969
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—7 1 Claim

1. A new and distinct variety of rose plant of the miniature rose class, substantially as shown and described, characterized particularly by attractive bright yellow and red bicolored flowers which are long lasting on the plant.

PATENTS

GRANTED NOV. 21, 1989

ERRATA

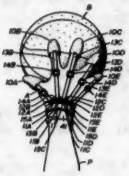
For CLASS	See PATENT NO.
606-084	4,881,534
606-098	4,881,535
606-094	4,881,536
606-084	4,881,537
227-178	4,881,544
227-178	4,881,545
280-287	4,881,615
417-012	4,881,873
106-495	4,881,980
428-242	4,882,089
552-279	4,882,095
361-538	4,882,115
427-126	4,882,183
514-185	4,882,234
401-032	4,882,304
310-323	4,882,500
310-316	4,882,525
328-028	4,882,571
362-373	4,882,667
379-284	4,882,699
365-051	4,882,700
364-401	4,882,724
364-187	4,882,778
380-024	4,882,779
378-084	4,882,780
364-510	4,882,781
361-100	4,882,782
360-134	4,882,783
364-567	4,882,784

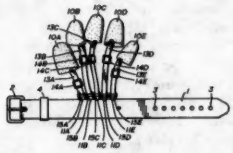
PATENTS

GRANTED NOVEMBER 21, 1989

GENERAL AND MECHANICAL

4,881,275
BASKETBALL GRIPPING GLOVE
Albert Cazares, 5303 Manner Oak, Kingwood, Tex. 77339, and Holland R. Gibson, Jr., 1162 Cottage Oak, Houston, Tex. 77091
Filed Jun. 3, 1988, Ser. No. 201,946
Int. Cl.[4] A41D *19/00*; A63B *63/00*
U.S. Cl. 2—161 A **3 Claims**

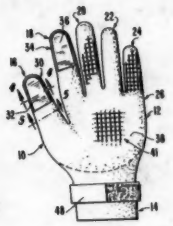




1. A new and improved basketball gripping apparatus comprising:
a. an anchor strap;
b. a means of fastening said anchor strap about user's wrist;
c. five elastomeric bands
d. one finger cowl for attachment to one end of each of said elastomeric bands opposite said anchor strap, wherein said finger cowls are constructed of a thin rubber, elastic or other material possessing a high coefficient of friction;
e. said elastomeric bands having a sufficiently low coefficient of elasticity to maintain said finger cowls adjacent to and in direct abutment with the user's fingers at all times; and wherein,
f. said five elastomeric bands are made adjustable in length, with each band comprising; a ring; means operatively connecting said ring to said anchor strap; and a slide buckle, wherein each elastomeric band is fixed to said finger cowl at one end, with its second end threaded through said slide buckle and then through said ring and then fixed to said buckle.

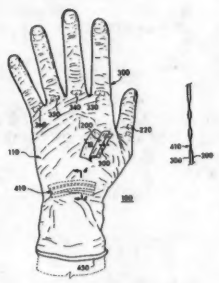
4,881,276
REINFORCED COLD WEATHER SPORTS GLOVE
Richard L. Swan, 1260 Monroe St., Reno, Nev. 89509
Filed Apr. 28, 1988, Ser. No. 187,552
Int. Cl.[4] A41D *19/00*
U.S. Cl. 2—161 A **18 Claims**

1. A sports glove comprising:
a hand portion having a palm side and a backhand side;
a plurality of tubular portions, extending from said hand portion, for receiving a thumb, an index finger, a middle finger, a ring finger and a pinky, each having a palm side, a backhand side and a free distal end;
a first of said tubular portions having a first layer of compressible foam material having an outer surface with a high coefficient of friction on its palm side; and
a second of said tubular portions having a first layer of compressible foam material with an outer surface on its palm side, and an additional layer of flexible material having an outer surface with a low coefficient of friction, said additional layer overlying said first layer's outer surface of said second tubular portion,
whereby said first layers of said first and second tubular portions are compressible to create additional gripping



ability by said first tubular portion and said second tubular portion which permit the user to grasp and release objects with more precision and sensitivity and whereby said additional layer provides an enhanced sliding surface to the glove.

4,881,277
PROTECTIVE GLOVE AND METHOD OF MANUFACTURE
Gregory A. Hogle, 1675 Niagara, Denver, Colo. 80220
Filed Jun. 15, 1988, Ser. No. 207,262
Int. Cl.[4] A41D *19/00*
U.S. Cl. 2—169 **8 Claims**



8. A method of forming surgical gloves for protection against punctures, said method comprises the steps of:
(a) forming a first inner layer;
(b) forming a separate second outer layer of slightly larger diametrical width and of substantially same finger lengths as the first inner layer;
(c) bonding said inner and outer layers at bonding areas at the base of the digit member portions on the palm side of said glove, at the knuckles of said digit portions on the back side of said glove and on the wrist portion on said palm and back sides of said glove to allow flexibility of hand movement;
(d) rolling the ends of said inner and outer layers extending beyond the wrist portions together to form gripping means.

4,881,278

COMBINATION PACKAGE FOR DISINFECTING AND COVERING TOILET SEAT

Khaled S. Farah, 1512 W. Chalgrove, Corona, Calif. 91720

Filed Jan. 11, 1988, Ser. No. 141,835
Int. Cl.[4] A47K *13/14*
U.S. Cl. 4—243 **1 Claim**

1. A single-use unitary package for carrying toilet seat disinfecting/covering materials on the person and for conveniently using and dispensing such materials, said package comprising, in combination:

(a) flexible, liquid-proof opposed sheets, releasably sealed together along opposed peripheral edges and along a line between two opposite ends thereof, to form two separately openable liquid-tight compartments having inner opposed faces;

(b) a dry toilet seat cover in a first one of said compartments; and

(c) a toilet seat disinfectant -impregnated pad material secured to the inner opposed faces of said sheets in the other of said compartments,

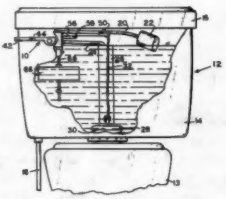
said first compartment, while unopened, forming a handle for grasping said package with said other compartment opened and said pad material exposed for disinfecting wiping off said toilet seat.

4,881,279

DUAL FLUSH MECHANISM

Donald E. Harney, 1113 Highway 99 North, Eugene, Oreg. 97402

Filed Mar. 20, 1989, Ser. No. 325,886
Int. Cl.[4] E03D *1/14, 3/12*
U.S. Cl. 4—324 **5 Claims**



1. A dual flush mechanism, to provide a full-flush and a partial-flush capability for toilets with a tank, in combination with a single flush valve, which dual flush mechanism comprises:

a. a flush valve actuating arm, having a first end and a second end, attached near or at its second end to the flush valve by means of a flexible connecting member;

b. a first handle control means, to which the first end of the flush valve actuating arm is attached;

c. wherein the combination of first handle control means, flush valve actuating arm, flexible connecting member, and flush valve comprise the full flush capability;

d. a partial-flush control arm, having a first end and a second end, the partial-flush control arm being constructed to be capable of engaging and lifting the flush valve actuating arm;

e. a second handle control means, to which the first end of the partial flush control arm is attached;

f means for limiting the movement of the partial-flush control arm due to operation of the second handle control means, thereby also limiting the resulting upwards rotational movement of the second end of the flush valve actuating arm due to the movement of the partial-flush control arm;

g. a partial-flush control plate, forming a portion of said partial-flush control arm;

h. a partial-flush control lever, having a first end and a second end, pivotally supported between said first and second ends at a pivot axis;

i. a partial-flush float, attached by a rigid connecting member to said first end of said partial-flush control lever; and

j. a lever extension attached to said second end of said partial-flush control lever;

k. wherein movement of the second handle control means will pivot the partial-flush control arm, to the extent permitted by the movement limiting means, thereby lifting the second end of the flush valve actuating arm a limited distance, and, through the flexible connecting member, lifting the flush valve a limited distance to permit egress of water from the tank; subsequent release of the second handle control means permitting the partial-flush control arm to rotate downwards until the lower edge of the control Plate rests against the transversely extending lever extension, thereby also limiting the downward movement of the flush valve actuating lever and keeping the flush valve in a partially open position with associated continuing water egress; said water egress lowering the position of the partial-flush float thereby pulling the first end of the partial-flush control lever downwards and rotating the partial-flush control lever about its pivot axis thereby causing the attached lever extension to retract out from beneath the partial-flush control plate, said retraction freeing restraint on the partial-flush control arm, allowing further downward movement of the partial-flush control arm, with a corresponding downward movement of the flush valve actuating arm and the reseating of the flush valve so as to terminate the egress of water from the tank; with refilling water raising the water level of the tank, the partial-flush float correspondingly rising, the first end of the partial-flush control lever being lifted, through the rigid connecting member attached to the partial-flush float, so as to move the lever about its pivot axis, causing the lever extension to move until in pressured contact against the side of the partial-flush control plate of the partial flush control arm, thereby terminating the partial flush cycle by the dual flush mechanism.

4,881,280

WATERFALL PRODUCING UNIT FOR USE IN SWIMMING POOLS

Fred C. Lesikar, 641 Ryan, La Habra, Calif. 90631

Filed Dec. 2, 1988, Ser. No. 279,431
Int. Cl.[4] B05B *1/34;* E04H *3/18*
U.S. Cl. 4—507 **14 Claims**

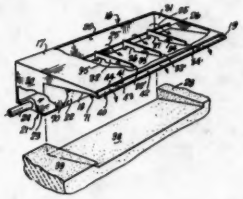
1. A unit for producing a waterfall at the edge of a swimming pool, spa or the like, said unit adapted to be mounted in the side of the pool, spa or the like and being capable of producing a smooth sheet of water which is directed away from the side of the pool, spa or the like, said unit comprising:

a hollow unit body adapted to be mounted in the side of a

pool, spa or the like said hollow unit body having a top, a bottom, a front, a back and a right side and a left side;

a throat portion at the front of said hollow unit through which water is directed outwardly from said hollow unit body, said throat portion adapted to extend slightly past the side of the pool, spa or the like and said throat portion having an upper edge and a lower edge;

a manifold portion into which water is introduced, said



manifold portion being located near the back of the unit body, and said manifold portion adapted to be located behind the side of the pool, spa or the like; and

at least one baffle extending substantially vertically over the majority of the distance between the top and the bottom of the hollow unit body, and said baffle extending between the right side and the left side of said body, and said baffle being positioned between the manifold portion and the throat portion and nearer the manifold portion.

4,881,281

BATHING DEVICE, IN PARTICULAR FOR BATHING BABIES

Jean-Claude Lavoine, 14 rue de la République, 77590 Bois-le-Roi, and Arséne Guedaguian, Neuilly-Plaisance, both of France, assignors to Jean-Claude Lavoine, France

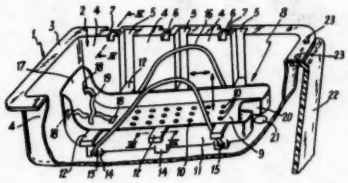
PCT No. PCT/FR87/00407, § 371 Date Jun. 17, 1988, § 102(e) Date Jun. 17, 1988, PCT Pub. No. WO88/03000, PCT Pub. Date May 5, 1988

PCT Filed Oct. 19, 1987, Ser. No. 224,878

Claims priority, application France, Oct. 22, 1987, 86 14648

Int. Cl.[4] A47K *3/024*

U.S. Cl. 4—572 **12 Claims**



1. An infant bathing device comprising

(a) a rigid receptacle having a bottom, an opened top with a rim and side walls, wherein at least two facing side walls have interior vertically contoured surface portions;

(b) a rigid platform means for supporting an infant in a sitting and reclined position and having a perforated bottom and being configured such that the platform is vertically movable within the entire receptacle while being in a substantially horizontal plane;

(c) an entire rigid periphery of the platform wherein the periphery has at least some periphery contoured portions which are contoured substantially opposite to and engagable within the said receptacle contoured surface portions, whereby the periphery contoured portions are vertically slidable in the said receptacle contoured surface portions so that the platform is vertically movable to any vertical position within the receptacle while being in a substantially horizontal plane and whereby the platform can be vertically moved to the top of the receptacle and the said contoured portions horizontally offset so that the platform is supportable by the said rim; and

(d) lifting means associated with the platform for vertically moving the platform.

4,881,282

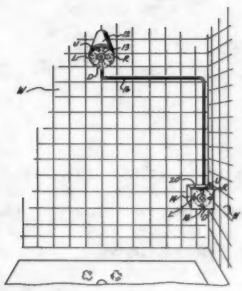
ADJUSTABLE SHOWER HEAD

Edward J. George, and Frances George, both of Box 245, Fernie, Canada (V0B 1M0)

Filed Aug. 10, 1988, Ser. No. 230,356

Int. Cl.[4] A47K *3/22*

U.S. Cl. 4—604 **4 Claims**



2. An adjustable shower head, comprising:

a shower head mounted for pivotal adjustment;

a remotely disposed pivotally mounted joystick;

a control yoke secured to said joystick;

a rigid hollow tube extending between said shower head and said joystick;

four elongated cable sheaths secured within said tube;

an elongated control cable received for longitudinal reciprocal sliding movement in each of said sheaths;

an upper end of each of said cables secured to said control yoke, said upper cable ends spaced in a common plane at ninety degree intervals around said control yoke;

a lower end of each of said cables secured to said master yoke, said lower end spaced in a common plane at ninety degree intervals around said master yoke; and

each of said lower cable ends oriented one hundred and eighty degrees from the respective upper cable end position on said control yoke, whereby movement of said joystick in any direction moves said shower head in a corresponding direction.

4,881,283

SELF CONTAINED EYE WASH FOUNTAIN

John R. Liautaud, 180 Stonegate, Cary, Ill. 60013

Filed Sep. 9, 1988, Ser. No. 243,067

Int. Cl.[4] A61H *33/04*; B65B *3/04*; B67D *3/00*

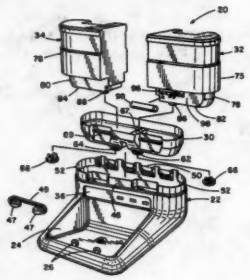
U.S. Cl. 4—620 **15 Claims**

1. A self-contained emergency eye wash fountain for siting without connection to a remote source of eye wash liquid, said fountain comprising:

a fountain base including at least one liquid discharge orifice and a reservoir for holding a supply of eye wash liquid, said reservoir being positioned above said orifice, said base further including a flow channel means connecting said reservoir and said orifice;

at least two separate tanks each containing eye wash liquid supported by sad base and independently removable from said base, each tank having a mouth adjacent its lower end extending into said reservoir, the mouth of each tank

being the only opening of that tank, the mouth of one tank being disposed above the level of the other tank, each of said tanks having a bottom wall and a neck dependent from the bottom wall and terminating in said mouth, the neck of said one tank being shorter than the neck of the other tank; and



means for blocking and unblocking the flow of the eye wash liquid from said reservoir t said orifice whereby with said means permitting the flow, said one tank drains before said other tank and the level of the eye wash fluid in said reservoir drops from a higher level to a lower level when said one tank has drained.

4,881,284

SELF-CLEANING RESTROOM

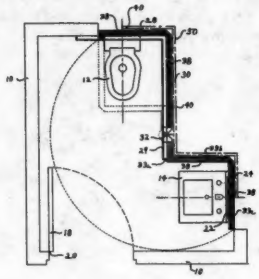
Glenwood L. Garvey, Los Angeles, Calif., assignor to Self-Cleaning Environments, Inc., Santa Monica, Calif.

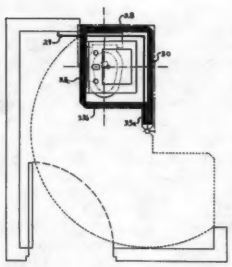
Filed Oct. 21, 1988, Ser. No. 260,936
Int. Cl.[4] A47K *4/00*
U.S. Cl. 4—662 **5 Claims**

1. In a self-cleaning restroom of the type having at least one non-rotatable wall member associated with a fixed toilet and at least one rotatable wall member supporting a restroom fixture and adapted to move between a first position in which said toilet and said fixture are accessible for use and a second position in which said wall members, said toilet and said fixture are nested in close proximity to each other to define a cleaning space for automatic cleaning; means for cleaning said walls, toilet and fixture in their second position with a fluid solution; restroom fixture support means carrying said fixture; means for rotating the fixture support means into said second position; stationary and non-rotatable plumbing means including stationary plumbing lines in fluid communication with said toilet; fixture plumbing means in fluid communication with said fixture and in fluid communication with said stationary plumbing means, including plumbing lines and means for rotating at least a portion of said plumbing lines and means for rotating at least a portion of said plumbing lines with respect to said stationary plumbing lines; and said cleaning means including cleaning lines and means for rotating at least a portion of said cleaning lines with said fixture support means with respect to said stationary plumbing lines, the improvement comprising:

one of said wall members having first and second wall sections formed at right angles to form a non-recess single angle wall member; and

at least one other of said wall members having a zig-zag double angle configuration, with first, second, and third wall sections, said second wall section being formed at a first right angle to the first wall section, and said third wall section being recessed relative to at least the width of said restroom fixture with respect to said single angle wall





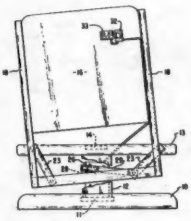
member and being formed at a second right angle opposite to said first right angle.

4,881,285

MOTORIZED CRADLE

Rhinhold J. Zeeb, Box 506, Menno, S. Dak. 57045

Filed Nov. 3, 1988, Ser. No. 266,844
Int. Cl.[4] A47D *9/02*
U.S. Cl. 5—103 **3 Claims**



1. A cradle comprising a base member and a bed member, linkage between said base member and said bed member whereby said bed member is supported from said base member, said linkage being pivotally attached to said base member and said bed member to form a trapezoidal figure having a longer part at the top of said trapezoid and a shorter part at the bottom of said trapezoid, and power means including a motor mounted on said base member, said motor having a shaft, crank means mounted on said shaft, and link means connected between said crank means and said bed member whereby motion of said

shaft causes a rocking of said bed member, said link means being L-shaped in plan form having one long leg pivotally connected to said crank means and one short leg at right angle to said long leg, said short leg being of a resilient material to provide a resilient connection between said bed member and said crank means.

4,881,286

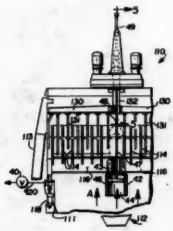
EFFECTIVE DIFFUSER/THICKENER SCREEN BACKFLUSHING

Johan C. F. C. Richter, Olso, Norway; Ole J. Richter, and Finn Jacobsen, both of Karlstad, Sweden, assignors to Kamyr AB, Karlstad, Sweden

Division of Ser. No. 125,710, Nov. 27, 1987. This application Aug. 29, 1988, Ser. No. 237,407

Int. Cl.[4] D21D *5/02*

U.S. Cl. 8—156 **9 Claims**



1. A method of effecting treatment of pulp, a liquid slurry of cellulosic fibrous material, with screens while minimizing screen clogging, utilizing a generally upright vessel having a pulp inlet and a pulp outlet, the screens mounted to a supporting conduit within the vessel, and the screens having screening surfaces extending generally vertically, said method comprising the steps of:

(a) passing pulp generally vertically in the vessel from the inlet to the outlet;

(b) effecting substantially continuous extraction of liquid from the pulp slurry through the screens and through the screen support conduit at a predetermined flow rate;

(c) effecting generally vertical movement of the screens and support conduit in the direction of pulp flow at a first speed, and in the direction opposite pulp flow at a second speed much higher than the first speed;

(d) when moving the screens in the direction opposite pulp flow, supplying a known volume of liquid, by means of an element that is independent of the screen movement, to the conduit and screens from within the vessel to effect backflushing of the screens without a surge in the vessel volume; and

(e) controlling the continuous extraction flow rate with respect to the known volume of backflushing liquid so that the known volume of backflushing liquid is sufficient to effectively back flush the screens to prevent clogging thereof.

4,881,287

APPARATUS FOR TREATING ROUND OBJECTS

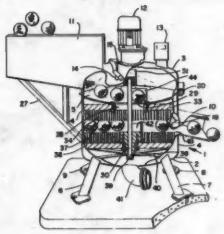
Jordan Knez, Industrivägen 21, S-Halmstad, Sweden

Filed Mar. 3, 1988, Ser. No. 163,942

Int. Cl.[4] A63B *47/04*

U.S. Cl. 15—21 A **12 Claims**

1. An apparatus for the treatment of round objects, for example the washing of golf balls, comprising two circular disks disposed in register and in spaced-apart relationship, at least one of the disks being provided with brush devices on its side facing the other disc the space between the disks being less than the diameter of the objects, one disk being rotary and one disk being fixed, a central aperture in the fixed disk for feeding objects into the space between the disks, said disks being disposed in a circular container having a cup-shaped bottom portion and a cup-shaped partition with a central aperture



corresponding to the central aperture in the fixed disk, said fixed disk being fixedly mounted on the underside of the partition.

4,881,288

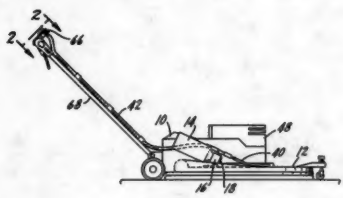
CENTER FEED DISPENSER FOR CLEANING SOLUTION

Barry A. May, North Tonawanda, N.Y., and James Armstrong, Lewiston, N.Y., assignors to Tennant Trend Inc., Niagara Falls, N.Y.

Filed Jul. 13, 1988, Ser. No. 218,631

Int. Cl.[4] A47L *11/34*

U.S. Cl. 15—98 **12 Claims**



1. In a cleaning machine for removing soilage from a surface, a mobile frame, a rotary cleaning element on the frame for working on the surface and power means for rotating it, the rotary cleaning element being constructed and arranged so that, when rotated at a relatively high speed, it will create an air pressure differential, a source of cleaning solution on the frame, and a connection between the cleaning solution source and the air pressure differential so that the air pressure differential causes cleaning solution to be supplied from the source to the center of the rotary cleaning element.

4,881,289

PAINT-COATING BRUSH

Nagata Tsuyoshi, and Fujita Katsuto, both of Osaka, Japan, assignors to Sunstar Engineering Inc., Osaka, Japan

Filed Apr. 27, 1988, Ser. No. 186,596

Int. Cl.[4] A46B *9/12*

U.S. Cl. 15—168 **2 Claims**

1. A paint-coating brush comprising:

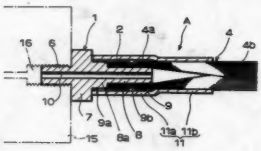
a body having an axial center bore;

piliform members provided on the outer surface of a cylindrical spindle-shaped portion which is formed at one end of said body;

a cylindrical sleeve which covers said piliform members on said spindle-shaped portion and securely fastens said pili-

form members to said body, forming a single unit with said body; and

a cover tube, said cover tube comprising a cylindrical socket portion having substantially the same inner diameter as the outer diameter of said cylindrical sleeve and an end portion having substantially the same inner diameter as



the inner diameter of said cylindrical sleeve, said socket portion and end portion being continuous to form a unitary structure, and said cover tube further being removably fitted on said cylindrical sleeve at its socket portion and covering said piliform members, except for the tip ends thereof, at its end portion.

4,881,290

MOPS AND MOP FRAMES

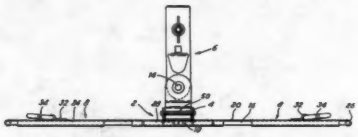
Jan Bohacek, Lower Kingswood, England, assignor to Jani-Jack Limited, Surrey, England

Filed Jul. 25, 1988, Ser. No. 224,125

Claims priority, application United Kingdom, Jul. 27, 1987, 8717742

Int. Cl.[4] A47L *13/258*

U.S. Cl. 15—228 **14 Claims**



1. A mop frame comprising a pair of frame sections, said sections being in laterally opposed relation and taking up an essentially co-planar extending configuration in a generally horizontal working position, pivot means on the frame, mutually adjacent end regions of said frame sections being engaged by said pivot means, remote from said adjacent regions opposite end regions of the frame sections each extending in cantilever manner in said extended configuration, said sections being downwardly pivotable on the pivot means to bring said opposite end regions towards each other to assume a collapsed configuration, attachment means at said opposite end regions of the frame sections for attaching a mop head to the frame, said attachment means being resiliently deformable in the lateral direction, whereby the mop head can be held taut by the attachment means when the frame sections are in their extended configuration and the attachment means can yield in response to shrinkage of the material of the mop head.

4,881,291

LOTTERY TICKET SCRAPER ENABLING PRECISE REMOVAL OF SURFACE LAYER FROM TICKET

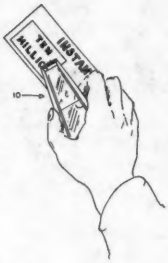
John L. Ellis, 301 Birch Ter., Winter Springs, Fla. 32708

Filed May 16, 1988, Ser. No. 194,103

Int. Cl.[4] A47L *13/02;* B26B *3/00*

U.S. Cl. 15—236.01 **10 Claims**

6. A hand held scraper device involving a generally elongate housing having a central cavity, said housing being defined by a comparatively narrow front portion, diverging side portions, a rear portion, and essentially flat top and bottom portions, said narrow front portion being rearwardly slanted, with a flat blade located at the bottom of said narrow front portion, in a position readily visible to the user of the scraper, closely located above which blade is a slot, said blade being usable as a



scraping tool by a person grasping said generally elongate housing, by the use of which blade, selected portions of the surface layer of a lottery ticket or the like can be carefully removed, with scrapings from the lottery ticket entering said slot for retention in said cavity.

4,881,292

HOUSING ATTACHMENT ASSEMBLY WITH A PLASTIC ATTACHMENT TAB AND A CLIP

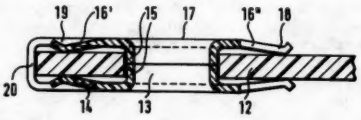
Richard Hoferer, Bietigheim-Bissingen; Arthur Klotz, Remseck; Volker Lehmann, and Günter Trumpfheller, both of Ludwigsburg, all of Fed. Rep. of Germany, assignors to Filterwerk Mann & Hummel GmbH, Ludwigsburg, Fed. Rep. of Germany

Filed Nov. 29, 1988, Ser. No. 277,350

Claims priority, application Fed. Rep. of Germany, Dec. 2, 1987, 3740760

Int. Cl.[4] B65D *55/00;* F16L *5/00*

U.S. Cl. 16—2 **8 Claims**



1. A housing attachment assembly comprising:

(a) a plastic attachment tab having at least one through aperture for receiving a fastening screw for attaching said housing to a support structure; and

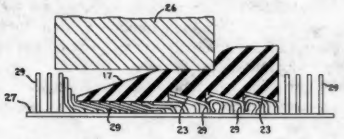
(b) a one-piece, U-shaped attachment clip with two generally parallel legs, said clip being arranged on said attachment tab with said tab projecting between said legs, each of said legs comprising a sleeve formed on the inside of the leg in the vicinity of said through aperture of said attachment tab, each said sleeve extending into said through aperture and being supported against the other sleeve when a fastening screw is screwed therethrough, and each of said legs further comprising at least one resilient tongue projecting into engagement with said attachment tab.

4,881,293

WEDGE MEMBER FOR USE ON CARPETED FLOORS

Francis A. Reynolds, 300 Edgeley Road, Cheadle Heath, Stockport, Cheshire, England

Filed Jul. 21, 1988, Ser. No. 222,049
Int. Cl.[4] E05C *17/54*
U.S. Cl. 16—86 A 1 Claim



1. A three dimensional wedge member designed to rest on a carpet to engage the lower edge of a door for retaining said door against movement:

said wedge member being formed of a resilient elastomeric material;

said wedge member having two upstanding side faces, a lower face, and an inclined longitudinally extending upper face;

said lower face having only three similarly configured transverse grooves, said three transverse grooves occupying slightly more than half of the length of the wedge member lower face in the thickest vertical section of the wedge member, said three grooves having a triangular cross-section and extending transverse to the side faces for the full width dimension of the wedge member;

each triangular groove being defined by a vertical upstanding side surface and an inclined roof surface; each said roof surface being inclined in a direction opposite to the direction of the incline of the wedge member upper face, each said roof surface being inclined at an angle of about seventeen degrees measured from the plane of the wedge member lower face;

the length of each said roof surface being about three times the height of each said groove side surface; each said groove side surface having a height of a least one eighth inch;

whereby each said groove is of sufficient volume and configuration as to cause pile yarns in the carpet to be bent by the groove roof surface toward the associated vertical side surface when the door exerts a downward force on the wedge member upper face.

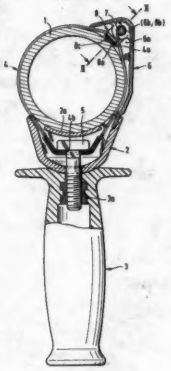
4,881,294

AUXILIARY HANDLE FOR HAND-HELD TOOL

Reinhard Riedl, Grossenzemoos, Fed. Rep. of Germany, assignor to Hilti Aktiengesellschaft, Fürstentum, Liechtenstein

Filed Sep. 15, 1988, Ser. No. 245,129
Claims priority, application Fed. Rep. of Germany, Sep. 16, 1987, 3731059
Int. Cl.[4] B23B *47/00;* B25G *1/00, 3/00*
U.S. Cl. 16—114 R 9 Claims

1. Auxiliary handle attachable to a hand-held device, such as a drill, comprising an axially elongated gripping sleeve having an axis, clamping means for fastening said handle on a housing part of a tool, said sleeve being rotatable about the axis thereof, said clamping means including a clamping member for encircling the housing part, said clamping member connected to said sleeve so that by selectively rotating sleeve the clamping member can be clamped on the housing part, said clamping means includes means forming a through guide for an axially elongated rod-shaped depth stop with the axis of said stop extending transversely of the axis of said sleeve, wherein the improvement comprises that said clamping member is a band-shaped member and is looped completely around said housing part and has an inside cross-section so that as said sleeve is selectively rotated, the inside cross-section of said clamping member is reduced and tightens about said housing part, a bearing part separate from said clamping member and arranged to contact the housing part and having at least one through opening for the depth stop, said bearing part being stationary during selective rotation of said sleeve, said through guide of



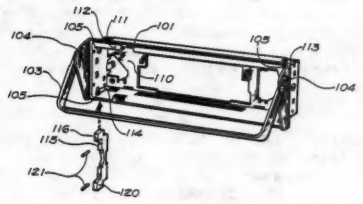
said clamping means being alignable with the through opening of said bearing part and said through guide being displaceable transversely of the axis of the through being displaceable transversely of the axis of the through opening for clamping said depth stop.

4,881,295

HANDLE ASSEMBLY FOR REMOVABLE AUTO ELECTRONIC EQUIPMENT

Walter Odemer, Burbank, Calif., assignor to Walter Odemer Co., Inc., Burbank, Calif.

Filed Aug. 19, 1988, Ser. No. 234,273
Int. Cl.[4] A47B *95/02;* G12B *9/00*
U.S. Cl. 16—114 R 3 Claims



1. In a foldable handle assembly for vehicle dash mounted electronic equipment having an enclosure with a flanged front face comprising:

a frame of substantially rigid sheet material having an opening therein corresponding to the exterior dimensions of the enclosure and a size corresponding substantially to the flanged front of said enclosure;

said frame including a pair of ears extending in front of the front face of the enclosure from opposite sides thereof;

a handle pivotally secured to said pair of ears and having dimensions closely approximating the dimensions of the flanged front face of the electronic assembly enclosure whereby said handle may be pivoted from a virtually unnoticable position along the flanged front face of the electronic equipment to a working position in front of said flanged front face;

the improvement by which said frame is securable to said

electronic equipment by tabs extending through openings in the enclosure of said electronic equipment and bearing upon one edge of said openings; and

locking means having one surface bearing gupon said tabs to hold said tabs against the edge of said opening and a second surface bearing against said enclosure.

4,881,296

VARIABLE HINGE FOR A DOOR OR WINDOW

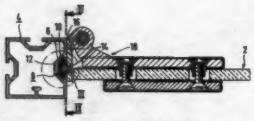
Mario Marinoni, Magenta, Italy, assignor to Casma S.p.A., Magenta, Italy

Filed Feb. 3, 1989, Ser. No. 305,909

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1988, 3805095

Int. Cl.[4] E05D 7/04

U.S. Cl. 16—237 3 Claims



1. A mounting for a covering for an opening, comprising:

a vertical frame piece which provides a vertically extending receiving space, said space being accessible through a vertical slit;

an anchor member located within said receiving space, said anchor member having an internal thread, a transverse dimension smaller than the width of the slit, and a longitudinal dimension greater than the width of the slit;

a hinge attached to said anchor member via attaching means for engaging said internal thread; and

a friction drive member which contacts said anchor member and is penetrated by the screw, said friction drive member comprising an elastomeric O-ring provided in the slit and an annular collar contacting the internal thread of said anchor member, said annular collar having an external diameter smaller than the width of the slit, wherein the sum of the thickness of the annular collar and the thickness of the O-ring is greater than the depth of the slit.

4,881,297

FURNITURE HINGE WITH SNAP-IN MECHANISM

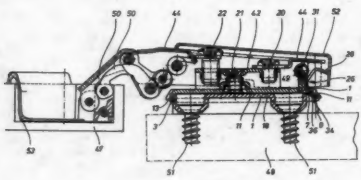
Alfred Grass, Höchst, Austria, assignor to Grass AG, Hochst/Vlbg., Austria

Filed Sep. 28, 1988, Ser. No. 250,346

Claims priority, application Fed. Rep. of Germany, Oct. 6, 1987, 3733700

Int. Cl.[4] E05D 7/12

U.S. Cl. 16—258 8 Claims



1. A furniture hinge for mounting a door to an article of furniture comprising: an articulation housing mounted on the door; one or more swivel arms pivotally connected at one end to said housing; a cover bracket connected to the other end of said swivel arm; an adjusting plate secured to said cover bracket; a mounting plate secured to said cover bracket; a base plate mounted on the furniture article having an upwardly curved sliding surface, said mounting plate having a hook-shaped supporting surface and a spring-mounted rocker, said rocker having backwardly curved locking shoulders with gripping projections that lockably engage said base plate upwardly curved sliding surface thereby forming a snap-in mechanism for locking the door and components of the hinge onto the base plate, said mounting plate having a wing and an opening therein cooperatively receiving said rocker and said rocker has an offset gripping wing and a bushing spring holding said rocker in an engaged position with said gripping wing.

4,881,298

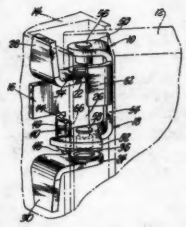
SEPARABLE DOOR HINGE FOR VEHICLE BODY

Roy C. Turnbull, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 21, 1988, Ser. No. 223,127

Int. Cl.[4] E05D 7/10

U.S. Cl. 16—266 6 Claims



1. A separable door hinge for removably hanging a door on a vehicle body comprising:

first and second hinge leaves mounted respectively upon the body and the door,

one of said hinge leaves having a pivot pin mounted thereon and the other hinge leaf having a hinge aperture adapted to engage the pivot pin to establish a door hinge pivot axis, said first and second leaves having portions bearing upon one another through a range of door pivoting movement so that the engagement is maintained between the hinge aperture and the pivot pin,

said door being separable from the body by pivoting the door beyond the range of door pivoting movement to disengage the bearing portions of the hinge leaves from one another and lifting the door axially of the hinge pivot axis to disengage the hinge aperture and the pivot pin,

and means provided on the hinge leaves adapted to facilitate rehanging of the door on the body by providing an auxiliary pivot axis offset from and parallel with respect to the door hinge pivot axis operable during attempted rehanging of the door and serving to enable swinging movement of the door about the auxiliary pivot axis to carry the pivot pin and the pivot aperature into axial alignment with one another so that the door mounted hinge leaf may be lowered onto the body mounted hinge leaf to then enable pivoting movement of the door about the door hinge pivot axis to within the normal range of door pivoting movement.

4,881,299

ORTHOPAEDIC AND ORTHOTIC BI-PIVOTAL HINGE WITH IMPROVED ADJUSTMENT MEANS

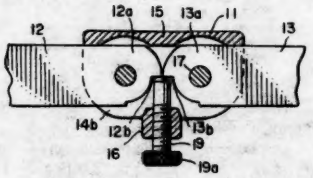
David E. Young, Bowler's Piece, 16 Couching Street, Watlington, Oxon, England (OX9 5QQ), and Kenneth P. Davis, 7 Dean Close, Hillingdon, Middlesex, England (UB10 9LB)

Filed Feb. 16, 1988, Ser. No. 156,250

Claims priority, application United Kingdom, Feb. 18, 1987, 8703823

Int. Cl.[4] E05D *11/06*

U.S. Cl. 16—371 8 Claims



1. An adjustable bi-pivotal hinge assembly comprising a hinge body including a pair of side plates with spaced opposing inner surfaces; first and second hinge arms having a pair of proximal end portions received between opposing inner surfaces of said side plates; pivot means pivotally connecting said hinge arms and said hinge body for independent movement of said arms between positions of flexion and extension about a pair of parallel pivot axes; each proximal end portion having a planar abutment surface parallel with said pivot axes; said abutment surfaces of said first and second arms extending in a common plane, facing in the same direction, and being disposed in side-by-side relation, when said arms are aligned in positions of full extension; said hinge body also including a screw housing having a threaded bore with a longitudinal axis normal to the common plane of said abutment surfaces when said arms are in positions of full extension; and adjuster screw means threadedly received in said bore and engagable with both of said abutment surfaces for limiting the extension of said arms.

4,881,300

MOLDING APPARATUS TO MOLD GROUND MEAT OR THE LIKE

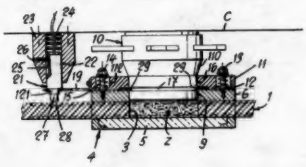
Andrea S. Chiodini, Bologna, Italy, assignor to La Minerva Di Chiodini Mario S.r.1., Bologna, Italy

Filed Dec. 6, 1988, Ser. No. 280,347

Claims priority, application Italy, Dec. 23, 1987, 12608 A/87

Int. Cl.[4] A22C *7/00*

U.S. Cl. 17—32 7 Claims



1. A molding apparatus particularly adapted to be associated to a meat chopper or the like comprising a die to mold the extruded ground meat for the formation of hamburgers, a formation chamber communicating with said die, a mold slidably guided in said formation chamber, a seat in said mold for receiving the extruded ground meat, a feeler or sensor monted on a support, to detect the movement of any portion of said molding apparatus when a hamburger has formed in said seat, means controlled by said feeler to automatically control the meat chopper, so as to disactivate it whenever a hamburger has been formed in said seat, and to re-activate it when the emptied mold is re-introduced into said formation chamber, resilient means for urging said sensor away from the meat chopper, the said molding apparatus being further provided with means mounted on the die of the meat chopper, which are in turn provided with an extension interferring with the sensor-supporting means or with the body of said sensor or with both said elements, and which keeps said sensor always suitably positioned with respect to the movable portion of the hamburger-forming molding apparatus, against the action of said resilient means associated to said sensor, regardless of the changes in the positioning of said molding apparatus due to the wear of the cutting knives.

4,881,301

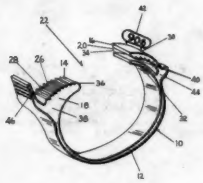
METHOD OF TYING THE OPEN END OF A BAG

Dennis R. Sweeney, 1010 N. Paradise Pl., Anaheim, Calif. 92806, and Gerald E. Hefner, 16162 Norgrove Cir., Huntington Beach, Calif. 92647

Filed Dec. 8, 1987, Ser. No. 130,012

Int. Cl.[4] B65D *77/10*

U.S. Cl. 24—30.5 R 1 Claim



1. A method of tying the open end of a bag comprising the steps of:

(a) gathering the wall of the bag together at an open end of the bag to close said open end,

(b) manipulating with one hand an open, arcuate, flexible band made of plastic and having opposed tips to insert the gathered bag wall between the opposed tips, which are spaced apart a distance exceeding 0.5 inch so that the gathered bag be readily inserted between said tips each of said tips having an interlocking member thereat, one member including a pair of flexible inner and outer lip elements extending toward the other member and spaced apart and aligned with each other to form an open mouth structure, and a tab carried on said outer lip element, and the other member including a tongue element which fits snugly between said lip elements in said open mouth structure, so that said members engage and releasably lock together upon said tips being pushed together manually, and

(c) with said one hand pushing the tips together to engage the interlockable members and encompass the gathered bag wall with the band and wherein with one hand the tab is grasped and pulled to peel away the outer member from the tongue element to open the band.

4,881,302

CORD OR ROD CLAMP

So-Sun K. Lee, #1-38 Moonwa-Dong Apt. D-408, Choong-ku, Daejeon, Choong-nam, Rep. of Korea

Filed Jul. 7, 1988, Ser. No. 215,998

Int. Cl.[4] F16G *11/00*

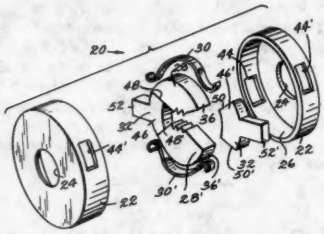
U.S. Cl. 24—136 R 21 Claims

1. A cord or rod clamp, comprising:

a housing defining a central opening and an interior compartment in fluid communication with said opening;

first and second opposed jaw members movably positioned within said compartment;

means in operative relationship with said housing and with said jaw members for normally positioning said jaw members in substantially contacting relationship with each other within said opening; and



wedge means movably positioned within said interior compartment and in operative relationship with said housing and with said jaw members for enabling an operator to selectively separate said jaw members from each other to permit insertion of a cord or rod into said opening and between said jaw members.

4,881,303

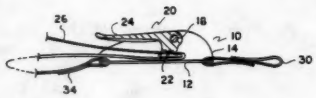
QUICKLY ADJUSTABLE STIRRUP BUCKLE

M. Vey Martini, 14243 Oxford Dr., Laurel, Md. 20707

Filed Feb. 17, 1989, Ser. No. 311,859

Int. Cl.[4] A44B *11/12*; B68C *1/20*

U.S. Cl. 24—170 **3 Claims**



1. A quickly adjustable stirrup buckle comprising:

a rectangular planar base portion;

said rectangular planar base portion having two vertical sides extending from the edges of said rectangular planar base portion;

said rectangular planar base portion having two parallel slots at the opposing longitudinal ends of said rectangular planar base portion, a buckle strap slot and a unitary stirrup strap slot;

wherein said buckle strap slot and said unitary stirrup strap slot being each threaded with a strap member, an uppermost buckle strap through said buckle strap slot and an unitary stirrup strap through said unitary stirrup strap slot;

said vertical sides having each an aperture allowing for the acceptance of an elongated cylindrical member connected therebetween;

said vertical sides having a rigid plate portion connected therebetween;

said cylindrical member being surrounded at least in part by a spring member enabling said cylindrical member to return to a fixed position when not forcibly moved;

said spring member being surrounded at least in part by a latch means having gripping means on the side of said latch means displaced next to said rigid plate portion;

said latch means being arcuately shaped;

whereby said unitary strap connecting to the topmost portion of the stirrup arrangement; and

whereby said buckle strap connecting to the saddle proper.

4,881,304

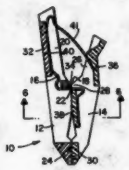
SELF-TIGHTENING PIVOTABLE GRIPPERS

Gabriel Colangelo, 35 Fearless Ave., Lynn, Mass. 01902

Filed Sep. 6, 1988, Ser. No. 240,509

Int. Cl.[4] A41F *1/00*

U.S. Cl. 24—511 **9 Claims**



1. A self-tightening pivotable gripper having two pin members and an elongated leaf spring, which pin members each have a jaw and pivot arm with a pivot portion therebetween, which spring bends around and joins said pin members at their respective pivot portions, so that said jaws and pivot arms are positioned in opposed pivotable relationship, the improvements comprising, (a) bending said spring around said pivot portions with a reverse curve to hold said pin members in secure pivotable alignment relative to each other, (b) with one end of said spring working against a bearing surface of a pin member on one side of said pivot portions and the other end of said spring working against the same pin member on the other side of said pivot portions and (c) providing one of said pivot arms with a backer wall therein for a spring section which extends outwardly from said pivot portions and proximate said backer wall on the inside thereof and thence bends to cross diagonally and inwardly toward the pivot zone of said two pin members, to extend to proximate the other of said arms in a diagonal spring span, so as to contact such other arm when an outward pressure is applied to said spring span so that said pivot arms are pushed apart more widely, closing said jaws more tightly.

4,881,305

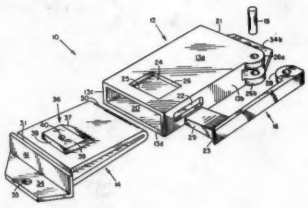
LOCKING BOX CLASP FOR JEWELRY

Jose C. Rivera, 216 S. Dakota, Laredo, Tex. 78041

Filed Apr. 29, 1988, Ser. No. 188,285

Int. Cl.[4] A44B *11/25*

U.S. Cl. 24—616 **10 Claims**



1. A clasp for removably uniting two ends of a jewelry chain, comprising:

a box, with a top wall containing a top opening therein and a bottom wall, a first side wall containing a side opening therein and a second sidewall, and an open front end wherein said box is generally rectangular and the top opening, the side opening, and the open front end of said box are likewise generally rectangular in shape;

a clip, with an apex, a release leg and an anchor leg, the release leg containing a boss thereon, the boss dimen-

sioned to fit within the top opening of said box, said clip for inserting, the apex first, into the open front end of said box until the boss engages the top opening of said box, such engagement thereby securing said clip to said box wherein said clip is folded over at the apex to form a generally "U"-shaped configuration such that during insertion of said clip into the open front end of said box, the release leg and the anchor leg require compression there between for the boss to clear the top wall of said box wherein said clip further contains a frontal closure, located on the anchor leg of said clip and sized such that it is flush with the open end of said box when said clip is fully inserted into said box and engaged therewith, the frontal closure sized such that it overlaps the first side wall for protecting a locking pin from accidental unlocking; and

said locking pin including a bar with a first and a second end articulated at the first end thereof to said box and movable in a plane generally parallel to the top wall, and having a locking tongue projecting from the second end of said locking pin, the locking tongue sized to fit within the side opening of said box and between the release leg and the anchor leg of said clip when said clip is inserted into said box, said locking pin for removably placing the locking tongue into said box, said locking pin dimensioned such that when said locking pin is inserted into said box, said locking pin lays flush against the side of said box;

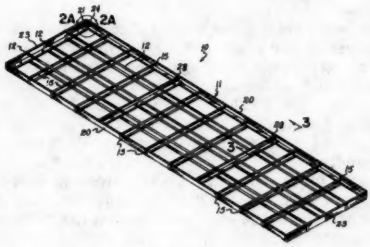
wherein the placing of the locking tongue into the side opening of said box prevents the boss from disengaging from the top opening by preventing compression of the boss and therefore prevents removal of said clip from said box, and the removal of the locking tongue from the side opening of side box allows compression of the boss and therefore disengagement and removal of said clip, and wherein said box, said clip and said locking pin are sized such that when said clip and said locking pin are engaged in said box, the clasp has a substantially smooth exterior, with generally plane, tubular sides.

4,881,306

CASKET BED

John Ernat, Oxford, Miss., and Dennis C. Laphan, Batesville, Ind., assignors to Batesville Casket Company, Inc., Batesville, Ind.

Filed May 22, 1989, Ser. No. 354,824
Int. Cl.[4] A63G *17/00*
U.S. Cl. 27—12 **8 Claims**



6. A casket bed comprising:

a rectangular frame of angle irons, said angle irons overlapping at the corners of said frame,

at each corner, one of said angle irons having a slot and the other having a tongue projecting into said slot and bent over to lay against the adjoining angle iron,

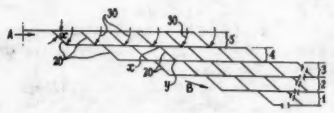
and polymeric straps wrapped longitudinally and transversely about said frame with ends overlapped and heat-sealed, said straps being under tension to keep said frame angle irons held tightly together and to prevent rattling.

4,881,307

EXPANSION OF SHEET MATERIALS

Rudi Gaissmaier, Lyndoch, Australia, assignor to Watership PTY. Ltd., Harrisfield, Australia

Filed Jun. 29, 1987, Ser. No. 67,709
Claims priority, application Australia, Jun. 30, 1986, PH06644
Int. Cl.[4] B21D *31/04*
U.S. Cl. 29—6.1 **4 Claims**



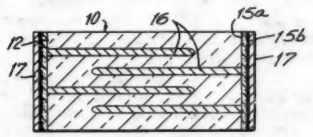
1. A process for the formation of expanded mesh materials wherein a substantially planar starting sheet having a predetermined regularly repeated pattern comprising parallel rows each containing a plurality of slots with each slot in any one row partially overlapping at each end with a different slot in its laterally adjacent row or rows thus forming a plurality of strands consisting of the areas of overlap between adjacent rows of slots at each end of a respective slot, is fed in a stepwise manner through a machine in which each alternate strand diagonal consisting of the successive strands between a given end of a slot in a first row and the opposite end of the adjacent slot in the adjacent second row, between the other end of said adjacent slot and the opposite end of the adjacent slot in the adjacent third row, and between opposite ends of similarly adjacent slots extending diagonally across the sheet, is clamped between working faces of opposed bending tools and bent in succession with all strands in any one diagonal being bent simultaneously, with each strand being bent in opposite directions at each of two positions between the slots which define the sides of each strand, the strands so bent being moved through an arc having a radius corresponding to the distance between said two positions, each strand in each strand diagonal being bent in the same manner and to the same extent so that the strands of the strand diagonal being bent remain in substantially parallel planes during and after bending.

4,881,308

METHOD OF TERMINATING LEAD FILLED CAPACITOR

William McLaughlin; Doug Lee, and Ricardo Garcia, all of Myrtle Beach, S.C., assignors to AVX Corporation, Great Neck, N.Y.

Filed Jul. 1, 1988, Ser. No. 214,513
Int. Cl.[4] H01G *4/30*
U.S. Cl. 29—25.42 **5 Claims**



1. In the method of manufacturing a ceramic capacitor of the lead filled type from a ceramic monolith having a plurality of electrode receiving voids, alternate said voids extending to opposite ends of the monolith, the improvement which comprises coating said ends of said monolith with a termination paste comprised of frit and at least one metal subject to oxidation when heated in an oxidizing environment, the selected metal being characterized in that the metal is wettable by lead and the oxide of such metal is essentially non-wettable by lead,

heating said monolith to fuse said frit, causing said coating to be exposed in heated condition to an oxidizing environment for a time sufficient to substantially oxidize the metal components of said paste adjacent the surface of said coating while metal components in the portions of said coating remote from said surfaces remain in an unoxidized or lesser oxidized condition, thereafter injecting lead into the interior of said voids through said coating, and thereafter applying a conductive metallic layer over said coating.

4,881,309

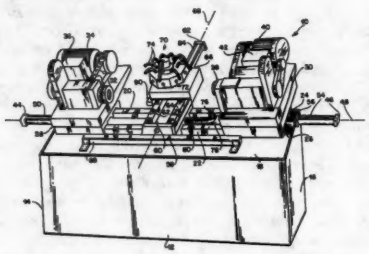
FLEXIBLE MACHINING SYSTEM

Reno D. Sansone, Watchung, N.J., assignor to Wadell Equipment Company, Inc., Edison, N.J.

Continuation of Ser. No. 648,897, Sep. 10, 1984, Pat. No. 4,719,676. This application Nov. 18, 1987, Ser. No. 122,068

Int. Cl.[4] B23B *3/30*

U.S. Cl. 29—27 A **20 Claims**



1. A flexible machining system, comprising first adjustable receiving means for interchangea bly and rotatably receiving workpieces or tools, whereby a tool received in said first receiving means can be removed therefrom and replaced with a workpiece or vice versa; first rotating means for rotating said first receiving means; first mounting means for mounting said first receiving means such that said first receiving means is movable bidirectionally along a first axis; second adjustable receiving means for interchangeably and rotatably receiving workpieces or tools, whereby a tool received in said second receiving means can be removed therefrom and replaced with a workpiece or vice versa; second rotating means for rotating said second receiving means; second mounting means for mounting said second receiving means such that said second receiving means is movable bidirectionally along said first axis and such that said second receiving means is arranged coaxially relative to said first receiving means; third receiving means for releaseably receiving a workpiece or a tool; third mounting means for mounting said third receiving means such that said third receiving means is movable bidirectionally along said first axis between said first and second receiving means and such that said third receiving means is movable bidirectionally along a second axis which is arranged perpendicular to said first axis, said third mounting means including a main slide movable bidirectionally along said first axis and a cross slide mounted on said main slide for bidirectional movement relative thereto along said second axis, said cross slide including attaching means for removably and interchangeably attaching a horizontal tool turret, a vertical tool turret, a workpiece holder of a jig milling slide to said cross slide such that said horizontal tool turret, said vertical tool turret, said workpiece holder or said jig milling slide functions as said third receiving means when attached to said cross slide, whereby said system has the flexibility to perform numerous diverse machining operatons; supporting means for supporting said first, second and third mounting means such that said first, second and third mounting means are movable bidirectionally and independently of each other along said supporting means, said supporting means including a single way system common to said first, second and third mounting means such that each of said first second and third mounting means is supported by said way system; first moving means for bidirectionally moving said first mounting means along said way system between a first position in which said first mounting means is remote from said third mounting means and a second position in which said first mounting means is adjacent one side of said third mounting means; second moving means for bidirectionally moving said second mounting means along said way system between a third position in which said second mounting means is remote from said third mounting means and a fourth position in which said second mounting means is adjacent an opposite side of said third mounting means, whereby when said first mounting means is in said second position and said second mounting means is in said fourth position said first and second receiving means are close enough to each other such that workpieces can be transferred from said first receiving means to said second receiving means or vice versa; third moving means for bidirectionally moving said main slide along said way system between said first and second mounting means; and fourth moving means for bidirectionally moving said cross slide along said second axis.

4,881,310

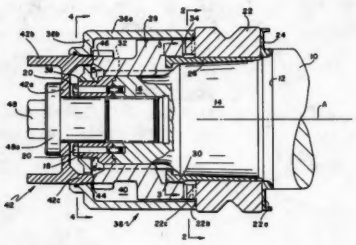
OVERHUNG ROLL ASSEMBLY

Philip Wykes, Shrewsbury, and David L. Pariseau, Southbridge, both of Mass., assignors to Morgan Construction Company, Mass.

Division of Ser. No. 133,798, Dec. 16, 1987, Pat. No. 4,813,113. This application Nov. 28, 1988, Ser. No. 276,646

Int. Cl.[4] B23P *19/00, 19/04*

U.S. Cl. 29—122 **2 Claims**



1. For use in combination with a roll shaft having a tapered portion and an end portion, an annular roll surrounding the tapered shaft portion and having circumferentially spaced keys in an outer face thereof, an abutment engageable with an inner face of the roll to axially locate the roll on the roll shaft, a tapered sleeve axially received in a tightly wedged position between the roll and the tapered portion of the roll shaft, an axially shiftable drive ring connected to the sleeve and splined to the shaft for rotation therewith, the drive ring having lugs rotatably interengaged with the keys on the outer face of the roll, a first retainer engageable with the outer face of the roll to axially urge the roll against the abutment, and a second retainer engageable with and acting through the drive ring to prevent axial removal of the sleeve from between the roll and the tapered portion of the roll shaft, a tool for axially shifting the tapered sleeve into and out of its wedged position between the roll and the tapered portion of the roll shaft, said tool comprising:

a cylinder defining a first open ended annular chamber containing a first annular piston, a second open ended annular chamber defined by said cylinder and said first piston, a second annular piston contained in said second chamber, means for axially fixing said cylinder in relation to said roll

shaft with said second piston in contact with said second retainer, whereupon the introduction of a pressurized medium into said second chamber will cause said second piston to act in one direction against said second retainer and through said drive ring to axially shift said tapered sleeve into said wedged position, and means for axially fixing said first piston in relation to said roll shaft with said cylinder in axial interengagement with said drive ring, whereupon the introduction of a pressurized medium into said first chamber will cause said cylinder to act in the opposite direction through said drive ring to axially shift said tapered sleeve out of said wedged position.

4,881,311

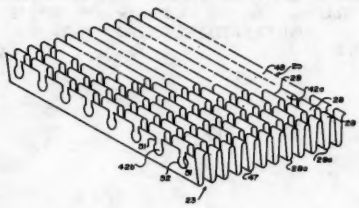
HEAT EXCHANGER ASSEMBLY WITH INTEGRAL FIN UNIT

Roger Paulman, Barrington, and Franz X. Wohrstein, Park Ridge, both of Ill., assignors to Peerless of America Incorporated, Chicago, Ill.

Division of Ser. No. 940,910, Dec. 10, 1986. This application May 26, 1988, Ser. No. 198,994

Int. Cl.[4] B21D *53/00*

U.S. Cl. 29—157.3 A **11 Claims**



1. A method of making a heat exchanger assembly comprising the steps of:

providing a fin unit having first and second surfaces by folding a first sheet of a heat conductive material back and forth on itself to provide accordion-like folds which define a plurality of fins on the first surface of the fin unit;

providing a plurality of notches in each of said fins;

providing a one-piece heat exchanger tube;

and wrapping the heat exchanger tube around the fin unit in a generally oval-shaped helical path with the tube threading the notches of the fin unit and being recessed relative to the first surface of the fin unit.

4,881,312

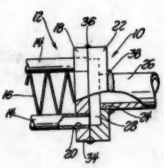
METHOD FOR MANUFACTURING A FITTING FOR A HEAT EXCHANGER

Dominic N. Dalo, Buffalo, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 22, 1988, Ser. No. 222,875

Int. Cl.[4] B21D *53/08*

U.S. Cl. 29—157.3 C **3 Claims**



1. The method of making a fitting for a heat exchanger having flat tubing comprising the steps of; forming a rectangular aluminum plate having slots for coupling with heat exchanger tubing, forming a second rectangular aluminum plate having a round opening for coupling with a nipple, forming a recess in the second plate around the opening of sufficient size to couple the opening to the slots when the plates are assembled, assembling the first and second plates at an interface and assembling a nipple into the opening, and bonding the second plate to the first plate and bonding the second plate to the nipple at the opening.

4,881,313

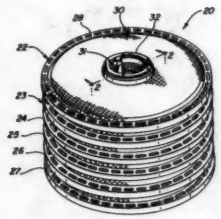
METHOD OF FORMING A CELL FILTER WITH AN EXPOSED SURFACE

Arto Artinyan, Southington, and John Krzyston, Guilford, both of Conn., assignors to Cuno, Incorporated, Meriden, Conn.

Filed Feb. 3, 1988, Ser. No. 151,853

Int. Cl.[4] B01D *29/34*

U.S. Cl. 29—163.8 **11 Claims**



1. A method for forming a multi-cell filter, comprising the steps of:

(a) forming a plurality of filter cells having reinforcing netting on external surfaces of a filter medium;

(b) removing a portion of the reinforcing netting to expose a surface of the filter medium for coactive sealing of the filter medium to a sealing member;

(c) disposing a sealing member on the exposed surface of the filter medium and on the surface of the netting to hold the netting; and

(d) compressing the sealing member against the cell to secure the netting to the cell and to sealingly engage the filter medium.

4,881,314

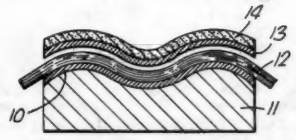
METHOD OF EXPLOSIVELY FORMING A MULTILAYERED COMPOSITE MATERIAL

Suresh K. Gupta, Alpharetta, and John T. Pinder, Marietta, both of Ga., assignors to Rolls Royce, Inc., Greenwich, Conn.

Filed Sep. 23, 1988, Ser. No. 248,188

Int. Cl.[4] B23P *17/04*; B23K *20/08*

U.S. Cl. 29—421.2 **2 Claims**



1. A method of manufacturing a multilayered composite material in which reinforcing fibres are embedded in a metal matrix, the method comprising the steps of providing in contact with an anvil a first metal layer consisting of a green compact of powdered metal particles bonded together by

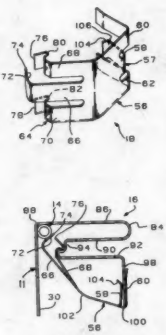
means of a suitable binder, laying at least one layer of reinforcing fibres onto said first metal layer, locating adjacent the fibres a second metal layer, providing an explosive charge adjacent the second layer consisting of a green compact of powdered metal particles or a metal bonded together by means of a suitable binder, on the side of the second layer remote from the fibres, detonating the explosive thereby to explosively form the second layer around the fibres and join the first and second layers and the fibres together, and subsequently sintering the explosively formed composite at a temperature below the reaction temperature of metal in said first and second metal layers with the material of the reinforcing fibres to reduce unwanted chemical reaction between said metal layers and said fibres layer.

4,881,315

METHOD OF ASSEMBLING AN ANTI-SWEAT HEATER IN A REFRIGERATOR CABINET

John M. Powell, Charlestown, Ind., and Louis D. Bruck, Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Filed Jan. 18, 1989, Ser. No. 300,528
Int. Cl.[4] B23P *11/02*
U.S. Cl. 29—450 **7 Claims**



1. A method of assembling an anti-sweat heater in a refrigerator cabinet comprising:

forming an outer sheet metal shell having side panels and a front face, said front face formed to provide a first U-shaped portion which includes a first outer wall perpendicular to the side panel to form a corner therebetween and a second inner wall spaced from the first outer wall, both walls being connected by the first U-shaped portion, said second inner wall being reversely bent to form a third wall and provide a second U-shaped portion formed between the second inner wall and the third wall and formed to provide a groove along the second U-shaped portion, said first, second and third walls being in spaced parallel planes with the third wall bent at a right angle to form a flange having a free terminal edge,

forming an anti-sweat heater retainer member from sheet metal having,

a body portion,

a first end portion having three spaced legs including a center leg and a side leg on each side of the center leg attached to and depending from the body portion,

a second end portion at the end of the body portion opposite from the first end portion having three spaced legs with free terminal ends and including a center leg and a side leg on each side of the center leg attached to and depending from the body portion in the same direction as the legs of the first end portion and having a depending tang portion with the terminal end of the center leg extending beyond the terminal ends of the side legs and each of the side legs having a reverse bend portion open in the direction of the tang portion of the center leg,

placing the anti-sweat heater in the outer metal shell near the corner located between the side panel and first outer wall,

inserting the anti-sweat heater retainer member into the outer metal shell,

positioning the legs of the first end portion of the retainer member so that the center leg bears against one side of the flange of the outer metal shell and the two side legs bear against the opposite side of said flange, and

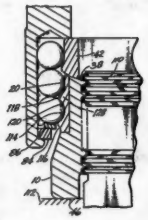
positioning the legs of the second end portion so that the tang portion of the center leg contacts the anti-sweat heater and urges it into the corner between the side panel and first outer wall while the reverse bend portion of the side legs are seated in the groove in the second U-shaped portion in spring biased relationship.

4,881,316

PROCESS FOR SETTING A THREADED TORQUE-LIMITED COLLAR AND PIN JOINT

George S. Wing, 531 Esplanade, Apt. 515, Redondo Beach, Calif. 90277

Division of Ser. No. 122,493, Nov. 16, 1987, Pat. No. 4,784,549, Continuation of Ser. No. 702,811, Feb. 15, 1989, abandoned.
This application Sep. 15, 1988, Ser. No. 245,133
Int. Cl.[4] B21D *39/00*; B23P *11/00*
U.S. Cl. 29—510 **4 Claims**



1. A process for making a joint that has a predetermined pre-load, the joint having at least one sheet, a threaded pin through the sheet, and an internally-threaded collar on the pin, the process comprising the steps of:

(a) engaging axially-extending troughs in bark of the collar with driving elements and by rotating said driving elements and tightening the threads of the collar onto the threads of the pin through such engagement; and

(b) continuing to rotate said driving elements to cause deforming and failing of the bark of the collar over the location of threaded engagement between the collar and pin with the driving elements in circumferential compression and developing circumferential furrows in the bark between the troughs by the driving elements plowing through the bark, the bark failing at the predetermined pre-load on the joint.

4,881,317

TERMINAL INSERTING APPARATUS

Maurice H. Brown, 11700 S. Mayfield, Worth, Ill. 60482

Division of Ser. No. 139,660, Dec. 30, 1987, Pat. No. 4,836,006.
This application Feb. 21, 1989, Ser. No. 313,175
Int. Cl.[4] H01R *43/00*
U.S. Cl. 29—739 **1 Claim**

1. An apparatus for picking up a terminal being supported horizontally, rotating the terminal to a vertical position, and inserting it in a plastic part, including:

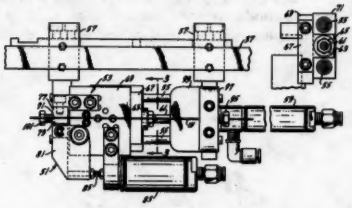
a tubular body having a terminal-receiving passage and an opening into the passage at a free end thereof,

said passage having a cross section that is slightly smaller than that of the terminal to be received therein,

said tubular body consisting of two longitudinal half sections held together near the free end thereof by an elastic member,

a larger diameter passage formed in a tubular body and connecting with the terminal-receiving passage,

an inertia rod positioned in the larger diameter passage in engagement with an end of the terminal located in the terminal passage,



means pivotally mounting said tubular body for rotation between a horizontal position and a vertical position in which the free end thereof extends downwardly,

means to rotate said tubular body between a horizontal position and vertical position, and

means to move said tubular body downwardly to insert the terminal in a plastic part and to return said tubular body to an upright position where it can be rotated to its horizontal position.

4,881,318

METHOD OF MANUFACTURING A LIQUID JET RECORDING HEAD

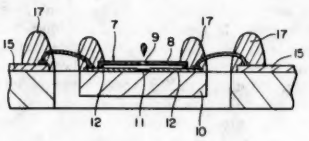
Hirokazu Komuro, Hiratsuka, and Masami Ikeda, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 77,090, Jul. 23, 1987, abandoned, which is a continuation of Ser. No. 740,494, Jun. 3, 1985, abandoned. This application Aug. 5, 1988, Ser. No. 228,677

Claims priority, application Japan, Jun. 11, 1984, 59-118333

Int. Cl.[4] H01R *43/00*

U.S. Cl. 29—827 **8 Claims**



1. A method for manufacturing a liquid jet recording head, comprising the steps of:

providing a recording head unit including a support having an energy generator thereon and a cover attached to said support to form therewith a liquid chamber, wherein said cover has an orifice therein opposed to said energy generator for discharging liquid in said liquid chamber from said orifice by operating said energy generator;

providing a substrate member comprising a frame having a wiring unit including at least one connector;

electrically connecting electrodes for supplying an electrical signal to said energy generator to generate energy used to discharge flying droplets and said wiring unit for supplying the electrical signal to said electrodes; and

molding said electrodes, said external wiring unit, said recording head unit and said substrate member into an integral unit with an insulative sealing material, wherein said connector extends externally of said integral unit.

4,881,319

PROCESS FOR MOUNTING CHIP TYPE CIRCUIT ELEMENTS ON PRINTED CIRCUIT BOARDS AND APPARATUS THEREFOR

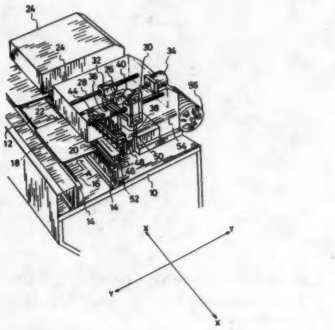
Hiroshi Yagi; Hisashi Fujita; Yoshio Harada, and Kenichi Takahashi, all of Tokyo, Japan, assignors to TDK Corporation, Japan

Continuation of Ser. No. 775,732, Sep. 13, 1985, abandoned. This application Jun. 26, 1987, Ser. No. 67,648

Claims priority, application Japan, Sep. 17, 1984, 59-192679; May 20, 1985, 60-106056; Jun. 10, 1985, 60-86380; Jun. 17, 1985, 60-90162; Jul. 26, 1985, 60-113797

Int. Cl.[4] H05K *3/34*; B23P *19/00*

U.S. Cl. 29—840 **5 Claims**



1. A mounting head for apparatus for mounting chip type circuit elements on printed circuit boards, said mounting head comprising

a suction pin for sucking up said chip type circuit elements thereon;

an air cylinder casing having a partition member separating said casing into a cylinder chamber and a vacuum chamber;

a piston slidable with respect to said cylinder chamber, said piston having a lower rod portion projecting from the lower end of said casing and an upper rod portion projecting through said partition member into said vacuum chamber;

a vacuum suction passage in said piston extending from the lower end of said lower rod portion to the upper end of said upper rod portion, said suction pin being affixed to said lower end of said lower rod portion; and

an air filter at said upper end of said upper rod portion, said air filter closing the upper end of said vacuum suction passage.

4,881,320

METHOD OF MAKING VENTED SEAL FOR ELECTRONIC COMPONENTS AND AN ENVIRONMENTALLY PROTECTED COMPONENT

Michael R. Kohle, Atascadero, and Durward H. Priebe, Paso Robles, both of Calif., assignors to CTS Corporation, Elkhart, Ind.

Filed Oct. 26, 1987, Ser. No. 112,615

Int. Cl.[4] H05K *3/30*; G01L *7/00*

U.S. Cl. 29—841 **17 Claims**

1. An improved process for sealing an electronic component having a housing with an aperture therein, and a chamber in

communication with the housing aperture, and a conductive portion extending through the housing, which comprises:

a. assembling the electronic component substantially within the housing chamber;

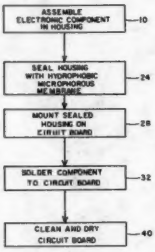
b. sealing the housing aperture with a hydrophobic, microporous membrane secured to the housing about the housing aperture;

c. positioning the assembled and sealed electronic component upon a circuit board having at least one conductive path thereon;

d. soldering the conductive portion of the housing to at least one conductive path on the circuit board; and

e. cleaning the assembled circuit board with a liquid that is substantially impervious to the hydrophobic, micro-porous membrane;

wherein the hydrophobic, micro-porous membrane provides substantial pressure equalization between the housing chamber and the surrounding environment during temperature and pressure variations, while substantially sealing the housing chamber from damaging amounts of contaminating fluids.



13. An environmentally protected electrical component comprising

a substantially enclosed chamber containing at least a portion of an electrical device means and a quantity of gaseous matter,

a selectively permeable means which allows relatively unimpeded transfer of gaseous matter and which is relatively impermeable to a first liquid means for cleaning and to solid matter, said selectively permeable means operatively interconnected to said chamber to allow passage of gaseous matter between said chamber and a region exterior to said chamber to yield gaseous pressure equalization therebetween,

whereby said selectively permeable means operatively prevents both said first liquid means for cleaning and solid matter from significant infiltration into said chamber.

4,881,321

METHOD AND APPARATUS FOR MAKING A HARNESS

Katsumi Komuro, Tokyo, Japan, assignor to AMP Incorporated, Harrisburg, Pa.

Filed May 1, 1989, Ser. No. 345,383
Int. Cl.[4] H01R *43/04*; B23P *19/04*
U.S. Cl. 29—861 **12 Claims**

1. An electrical cable-making apparatus, comprising: conductor-positioning means onto which an electrical cable is affixed and having first comb means including first spaces into which exposed ends of electrical conductors of the cable are disposed;

second comb means alignable opposite said first comb means and having second spaces in alignment with said first spaces of said first comb means when the first and second comb means are positioned opposite one another;

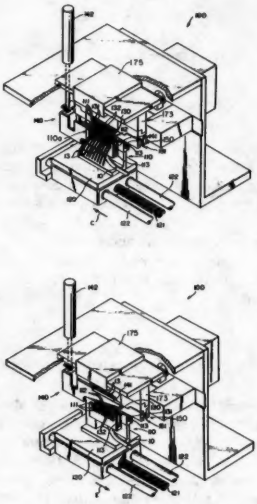
connector-retaining means for retaining an electrical connector having electrical contacts provided with termination sections and being positioned adjacent said second comb means with the contact termination sections being aligned with said second spaces;

conductor-moving means positioned along said first comb means and being movable from a first position to a second position whereby during such movement moving the conductors from the first spaces of the first comb means to the second spaces of the second comb means so that the conductors are aligned with the contact termination sections;

cutting means for cutting the conductors; and

means for terminating the conductors into the contact termination sections thereby effecting electrical connections between the conductors and the contacts.

8. A method of making electrical cable assemblies comprising the steps of:



positioning electrical conductors of an electrical cable in first spaces of a first comb member;

moving the conductors from the first spaces of the first comb member to second spaces of a second comb member that are aligned with the first spaces and also align the conductors with termination sections of electrical contacts of an electrical connector, the conductors being moved by a conductor moving means positioned proximate the first comb member, the conductor moving means being movable between a first position and a second position;

cutting the electrical conductors; and

terminating the conductors in the contact termination sections thereby effecting electrical connections between the conductors and the contacts.

4,881,322

MACHINE AND METHOD FOR MAKING SCREW-ON CONNECTORS

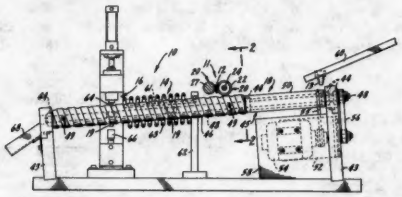
Jerome W. Finn, Waterman; Robert L. Montgomery, Ridott, and Frank B. Schuchard, Sycamore, all of Ill., assignors to Ideal Industries, Inc., Sycamore, Ill.

Continuation of Ser. No. 940,424, Dec. 22, 1986, abandoned, and a continuation of Ser. No. 165,032, Mar. 7, 1988, abandoned.
This application Apr. 13, 1989, Ser. No. 336,780
Int. Cl.[4] H01R *43/20*; B23P *19/00*
U.S. Cl. 29—878 **22 Claims**

1. A method of making screw on connectors which have an

insulating shell with a tapered bore open at one end and a tapered wire coil in the bore of the shell, including the steps of putting the coil in the bore of the shell, heating the coil sufficiently such that it in turn heats the bore of the shell in contact with it to soften the interior of the bore, thereafter applying a compressive axial thrust between the tapered bore of the shell and coil while the interior of the bore is still soft to force the coil further into the bore of the shell, and stopping the axial thrust when the coil and shell are in a predetermined axial relationship.

7. In a machine for assembling screw on electrical connectors which have a wire coil in the bore of an insulating shell that is closed at one end and open at the other, a pair of paired



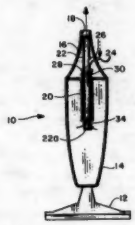
rotatably mounted spaced rails, one pair for the coils and the other pair for the shells, the pairs being constructed and arranged to accept and support a line of the coils and shells, an assembly station where the pairs of paired rails are brought together with the coil rails above the shell rails so that the coils may be dropped into the shells, a helical groove on at least one of the rails of each pair at the assembly station to support and space the individual coils and shells and to feed them when the rails are rotated, the coil helical groove being aligned with and terminating over the opening between the shell rails, and means for rotating and synchronizing the rails so that a shell will be under each coil to receive it when it is dropped by the coil rails.

4,881,323

DISPOSABLE AEROSOL RAZOR

Thomas McGaughan, 1601 Lee St., Melrose Park, Ill. 60160

Filed Mar. 29, 1988, Ser. No. 146,624
Int. Cl.[4] B26B *21/44*
U.S. Cl. 30—41 **3 Claims**



1. A disposable aerosol razor comprising:

a container/dispenser containing a shaving cream under pressure and having an aperture on a first end thereof and an elongated cylindrical bore aligned with said aperture therein, wherein said cylindrical bore includes a first end extending into the shaving cream;

a safety razor affixed to a second end of said container/dispenser;

an elongated linear tube disposed in said bore and movable along the length thereof and having a first open end positioned adjacent to the aperture in said container/dispenser and an aperature adjacent to a second end thereof;

biasing means coupled to sid tube for urging said tube to a first position in said bore, wherein the aperture adjacent to the second end of said tube is disposed within said bore and its second end blocks the first end of the bore to prevent shaving cream from entering said bore; and

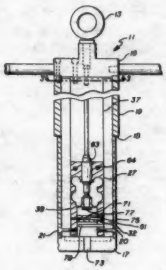
manual engaging means coupled to said tube for displacing said tube to a second position in said bore, wherein the aperture adjacent to the second end of said tube extends into the shaving cream allowing the shaving cream to enter said tube and exit said container/dispenser via the aperture therein.

4,881,324

APPARATUS FOR LINEAR MEASUREMENTS

Henry Khinchuk, Oak Park, Mich., assignor to GTE Valenite Corporation, Troy, Mich.

Filed Dec. 30, 1988, Ser. No. 292,055
Int. Cl.[4] G01B *7/12*
U.S. Cl. 33—555.1 **3 Claims**



1. Gauging apparatus for making at least one displacement measurement comprising a unitary flexure member, said flexure member comprises a pair of spaced apart and substantially parallel body sections, each body section includes an extending portion for contacting a workpiece to be gauged, spaced apart and substantially parallel top and bottom sections join said parallel body sections forming said unitary flexure member having a central opening, said unitary flexure member includes a plurality of webs formed by a sufficiently thin section of material so as to form a hinge, each of the parallel body sections include a pair of spaced webs for permitting said top and bottom sections to move in parallel motion, said bottom section includes an additional pair of webs for permitting movement of the respective extending portions toward and away from each other and a proportional movement of the bottom section in response to such movement of the respective extending portions, a transducer operably associated with the bottom section for sensing movement thereof, said transducer being operably associated with an indicator means for giving a positive indication of the movement of said respective extending portions.

4,881,325

STATIC FREE CLOTHES DRYER

Raymond L. Jordan, and Rita A. Jordan, both of Rte. 2, Box 139A, Tonganoxie, Kans. 66086

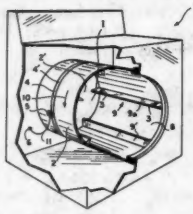
Filed Oct. 6, 1988, Ser. No. 254,189
Int. Cl.[4] H05F *3/00*
U.S. Cl. 34—60 **6 Claims**

1. An anti-static assembly for use in clothes dryers and like appliances having a rotatable drying drum including:

contact means within the drum engageable with clothes being tumbled therein and adapted to collect electrical charges from the clothes; and

conductive means joining said contact means within the drum to a stationary ground discharge point,

said conducting means comprising an electrically conductive band surrounding the dryer drum, wiring connecting



said contact means to said band, and stationary brush means engageable with said band, whereby

electrical charges built up in clothes in the dryer are neutralized.

4,881,326

STERILIZING DEVICE FOR A FREEZE-DRYING APPARATUS

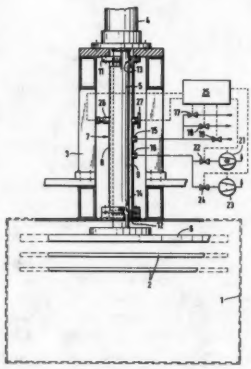
Heinz May, Pulheim, Fed. Rep. of Germany, assignor to Leybold Aktiengesellschaft, Cologne, Fed. Rep. of Germany

Filed Feb. 16, 1988, Ser. No. 156,002

Claims priority, application European Pat. Off., Feb. 13, 1987, EP87102062.4

Int. Cl.[4] F26B *13/30*; B25J *1/00*

U.S. Cl. 34—92 **7 Claims**



1. In a freeze-drying apparatus including a freeze-drying chamber; a plurality of generally horizontally oriented, vertically spaced and generally vertically displaceable shelf plates for supporting thereon receptacles containing the product to be freeze dried; a plate shifting rod projecting into the freeze-drying chamber and being operatively connected to said shelf plates; drive means situated externally of said freeze-drying chamber and being connected to said plate shifting rod for moving the plate shifting rod in directions into and out of said freeze-drying chamber; said plate shifting rod having a first position in which a length portion of said plate shifting rod is situated externally of said freeze-drying chamber and a second position in which said length portion is situated within said freeze-drying chamber; the improvement comprising a sterilization device including means defining a sterilizing chamber having opposite longitudinal ends; said sterilizing chamber adjoining said freeze-drying chamber and accommodating said length portion in the first position of said plate shifting rod; flanges surrounding said plate shifting rod and being mounted on said means at opposite longitudinal ends of said sterilizing chamber for closing off said sterilizing chamber; and a seal assembly mounted in each flange for effecting a seal between the plate shifting rod and a respective said seal assembly; the seal assembly mounted in at least one of said flanges including two sealing rings; said one flange having an inner face oriented towards said plate shifting rod; further comprising two spaced circumferential grooves in said inner face for receiving respective said sealing rings and a throughgoing radial bore provided in said one flange between said two circumferential grooves.

4,881,327

DRYER SECTION

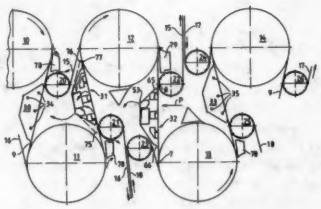
Ludwig Hauser, and Winfried Haessner, both of Heidenheim, Fed. Rep. of Germany, assignors to J. M. Voith GmbH, Heidenheim, Fed. Rep. of Germany

Filed Feb. 8, 1989, Ser. No. 308,258

Claims priority, application Fed. Rep. of Germany, Mar. 10, 1988, 3807857

Int. Cl.[4] F26B *5/00*

U.S. Cl. 34—114 **15 Claims**



1. A dryer section for a machine for the processing of fibrous webs, in particular paper webs, comprising:

several heatable drying cylinders arranged in a top row and a bottom row one above the other so that the fibrous web can meander over each drying cylinder successively while traveling in a running direction through the dryer section;

several carrier rolls associated with said several heatable drying cylinders, with at least one carrier roll disposed in one of said rows and located opposite a drying cylinder of the other row;

at least one top supporting belt allotted to the top row of cylinders and at least one bottom supporting belt allotted to the bottom row of cylinders, with each supporting belt running in the direction of web travel on a drying cylinder and over a carrier roll;

several air pockets associated with said heatable drying cylinders, each air pocket being delimited by a free peripheral part of a drying cylinder, by the opposite carrier roll and by the fibrous web; and

several web stabilizers, each disposed in one of the air pockets, for contactless stabilization of the run of the fibrous web, each of said web stabilizers including at least one nozzle element extending transversely across the width of the fibrous web and connected to a supply-air pipe, the nozzle element having an air blow slot open towards the fibrous web and a web-guiding surface interacting therewith;

said nozzle element being arranged in such a way that the direction of flow of the blow air over the web-guiding surface is the same as the running direction of the fibrous web, and said nozzle element having an exhaust side;

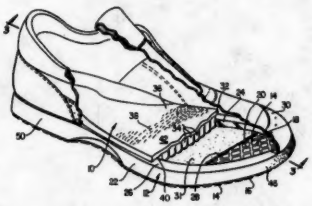
said nozzle element being arranged inside an exhaust air box having an exhaust air space on the exhaust side of each nozzle element, to which exhaust space is connected a pipe for the re-exhaust of the supplied blow air.

4,881,328

CUSTOM MIDSOLE

Lin Yung-Mao, Taichung, China, assignor to Autry Industries, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 97,806, Sep. 7, 1987, which is a division of Ser. No. 25,010, Mar. 12, 1987, Pat. No. 4,733,483.
This application Apr. 12, 1988, Ser. No. 180,529
Int. Cl.[4] A43B *13/14, 13/18, 13/04, 13/42*
U.S. Cl. 36—28 7 Claims



1. A shoe, comprising:
a thin, durable outsole having an outsole upper surface;
a cushionable midsole comprising at least one peripheral portion and a separate, removable insert, a lower surface of said peripheral portion joined to said outsole upper surface, said at least one peripheral portion forming a receptacle for receiving said insert;
said peripheral portion being designed to give structural support while being more cushionable and yieldable than said outsole;
said insert and said peripheral portion designed so that said insert supports the majority of the wearer's weight;
a reinforcing layer joined to said outsole upper surface within and laterally coextensive with said receptacle, said reinforcing layer being substantially thinner than the depth of said receptacle, said receptacle layer laterally coextensive with said receptacle and substantially less cushionable and more resilient than said peripheral portion so as to provide torisonal strength;
said removable insert having a lower surface for contacting said reinforcing layer and a preselected cushionability, said insert selected from among a plurality of like inserts having differing degrees of cushionability, the selected insert selected according to the weight of the wearer;
a lip member of said removable insert including an upper surface of said insert, said lip member extending laterally outwardly over an upper surface of said peripheral portion when said insert is inserted into said receptacle;
said lip member designed to provide one smooth and soft surface for the foot to rest upon; and
an upper joined to said peripheral portion.

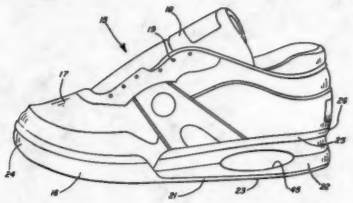
4,881,329

ATHLETIC SHOE WITH ENERGY STORING SPRING

Kevin J. Crowley, Brentwood, N.H., assignor to Wilson Sporting Goods Co., River Grove, Ill.

Filed Sep. 14, 1988, Ser. No. 244,035
Int. Cl.[4] A43B *21/30*
U.S. Cl. 36—38 15 Claims

12. An athletic shoe comprising a sole, an upper attached to the sole, and a spring positioned in the sole, the spring having top and bottom walls which are joined at the front and rear ends thereof and a center opening which extends laterally through the spring between the top and bottom walls, said sole including an out-sole and a mid-sole above the out-sole, the mid-sole having top and bottom surfaces and a spring chamber between the top and bottom surfaces, the spring being positioned within the spring chamber, both walls of the spring



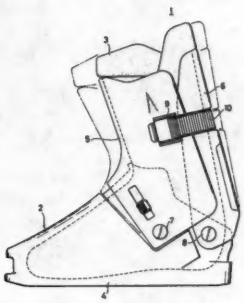
being convexly curved and the bottom wall being thicker than the top wall.

4,881,330

SKI BOOT

Shinichi Iwama, Saitama, Japan, assignor to Daiwa Seiko, Inc., Tokyo, Japan

Continuation of Ser. No. 146,421, Jan. 21, 1988, abandoned. This application May 29, 1989, Ser. No. 351,324
Claims priority, application Japan, Feb. 3, 1987, 62-23396
Int. Cl.[4] A43B *5/04, 1/14*
U.S. Cl. 36—117 6 Claims



1. A ski boot having improved flexural elasticity and abrasion resistance essentially consisting of an outer shell and an innerboot installed inside said outer shell, characterized by the fact that said outer shell is formed out of thermoplastic synthetic resin mixed with a desired amount of whisker.

4,881,331

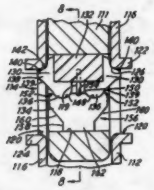
TEETH FOR USE WITH EARTH MOVING EQUIPMENT

George Paizes, Benoni, South Africa, assignor to Gamma Lock (Proprietary) Limited, Johannesburg, South Africa

Continuation-in-part of Ser. No. 827,577, Feb. 10, 1986, abandoned. This application Jul. 22, 1987, Ser. No. 76,468
Claims priority, application South Africa, Apr. 3, 1985, 85/2501; Sep. 4, 1985, 85/6769; Jan. 27, 1986, 86/8644; Jun. 12, 1987, 87/4224
Int. Cl.[4] E02F *9/28*
U.S. Cl. 37—142 A 22 Claims

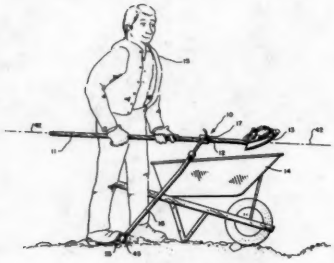
1. A shanked solid tooth having
(a) a shank which in use fits into an adapter in the form of a tooth socket secured to a bucket, the shank having therethrough a transverse passage, and
(b) a fastener within the passage comprising
(b.1) a pair of fastening members that have inner and outer ends and are pivot mounted relative to one another in a configuration to pivot about the inner ends from an

inner position in which they are contained wholly or substantially wholly within the passage to an outer position in which said fastening members project out of the socket, and



(b.2) biassing means to bias the fastener members apart from inner positions to the said outer positions.

4,881,332
SHOVEL LIFTING AID
Gary L. Evertsen, 4627 Porter Ave., Ogden, Utah 84403
Filed May 20, 1988, Ser. No. 196,251
Int. Cl.[4] E01H *5/02*
U.S. Cl. 37—285 **10 Claims**



1. An attachment for a shovel, or a like tool, having a material handling head and an elongate handle having a longitudinal axis, the attachment comprising:

an elongate stem extending vertically downward from the handle to the vicinity of the ground when the tool is oriented with the head in normal shoveling position;

pivot means providing pivotal movement about two different axes connecting the uppermost end of the stem directly to the handle, said uppermost end pivot connecting means permitting the handle to pivot up and down to provide a lifting motion in a plane containing the stem, and to be twisted about said longitudinal axis with respect to the stem to provide a dumping motion; and

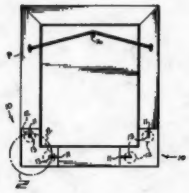
ground contacting means carried by the stem at its lowermost end, said ground contacting means permitting rotation of the stem about its lowermost end with respect to the ground at least about each of a pair of mutually perpendicular horizontal axes.

4,881,333
FRAME STABILIZING APPARATUS
Robert Manrubia, 422 Roading Dr., San Jose, Calif. 95123
Filed Oct. 27, 1987, Ser. No. 113,054
Int. Cl.[4] A47G *1/06*
U.S. Cl. 40—152.1 **4 Claims**

1. A picture frame stabilizing apparatus in combination with a picture frame formed with a plurality of upper and lower corners and a rear perimeter surface wherein said picture frame stabilizing apparatus comprises,

at least one "L" shaped means securable to a lowermost corner of said frame at a rear surface thereof, and

said at least one "L" shaped means formed with a plurality of leg portions wherein each leg portion includes an elongate slit formed therein originating at terminal ends of said leg

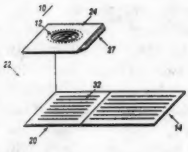


portions and extending inwardly along each leg portion of a distance substantially less than the length of each leg portion, and

securement elements positionable within said slits for penetration of a rear support surface, and

wherein each of said "L" shaped means includes an adhesive sponge-like portion formed at a rear surface of said "L" shaped means.

4,881,334
VIEWER
Morrie Brown, R.D. 1, Box 220A, Palisades, N.Y. 10964
Continuation-in-part of Ser. No. 56,156, Jun. 1, 1987, abandoned. This application Dec. 22, 1988, Ser. No. 288,236
Int. Cl.[4] G02B *27/04*
U.S. Cl. 40—365 **19 Claims**



1. An information display device comprising:

a body member having front, rear, and first and second side panels joined along contiguous edges, said rear panel being imperforate, said front, rear, and side panels having top and bottom edges;

a circular opening formed in the center of said front panel;

a plano-convex magnifying lens located in said central opening of said front panel and secured to said front panel on an inner surface thereof, said lens having a substantially flat surface and an oppositely facing convex surface, the lens being secured to said front panel so that said convex surface extends from said inner surface of said front panel, and said flat surface is substantially flush with said front panel;

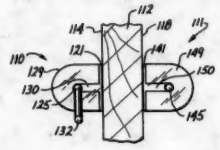
first information printed on substantially the entire rear panel, said printed information occupying a substantially larger area of said rear panel than is occupied by said magnifying lens on said front panel;

second information printed on said first side panel;

said body member being movable into a first condition so as to adopt a parallelepiped configuration and so as to align said magnifying lens with said rear panel for making all of said first information legible when viewed through said magnifying lens, said body member being movable into a

second compressed condition so as to align said magnifying lens with said second information printed on said first side panel for making said second information legible.

4,881,335
DOOR SIGN DEVICE
Kamran Khoshkish, 25081 Devon, Mission Viejo, Calif. 92691
Continuation-in-part of Ser. No. 143,737, Jan. 13, 1988. This application Apr. 19, 1988, Ser. No. 183,667
Int. Cl.[4] G09F *9/00*
U.S. Cl. 40—449 **4 Claims**



1. A door sign device for mounting on a door having an inner door surface and an outer door surface, comprising:

an actuator assembly mounted on the inner door surface, the actuator assembly including a ctuator and first mounting means for mounting the actuator on the inner door surface of the door so that a user can move the actuator between first and second actuator positions;

a follower assembly mounted on the outer door surface, the follower assembly including a follower and second mounting means for mounting the follower on the outer door surface so that the follower can be moved between first and second follower positions that each correspond to a respective one of the first and second actuator positions;

coupling means for coupling the actuator to the follower magnetically so that when the actuator is moved to the first actuator position the follower moves to the first follower position and when the actuator is moved to the second actuator position the follower moves to the second follower position;

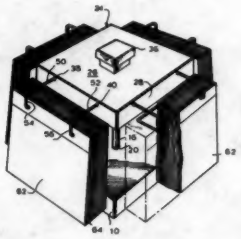
a predetermined sign located on the follower assembly; and

sign-indicating means responsive to the follower being in the first follower position for indicating that the predetermined sign applies;

wherein the first mounting means includes a first mounting member that is dimensioned and arranged to be mounted on the inner door surface, the first mounting member having a first mounting surface to be placed against the inner door surface, and the actuator is rotatably mounted on the first mounting member to enable rotation of the actuator between the first and second actuator positions about an actuator axis of rotation that is generally parallel to the first mounting surface; and

wherein the second mounting means includes a second mounting member that is dimensioned and arranged to be mounted on the outer door surface, the second mounting member having a second mounting surface to be placed against the outer door surface, and the follower is rotatably mounted on the second mounting member to enable rotation of the follower between the first and second follower positions about a follower axis of rotation that is generally parallel to the second mounting surface.

4,881,336
DISPLAY DEVICE
Melvin Braverman, and Joseph Lazar, both of Westbury, N.Y., assignors to Jefferson International, Westbury, N.Y.
Filed Jun. 3, 1988, Ser. No. 202,718
Int. Cl.[4] G09F *19/00*
U.S. Cl. 40—530 **2 Claims**



1. An improved display device for displaying selected items comprising:

a base;

an upright standard fixedly mounted by its lower end on said base;

a unitary frame including a polygonal top member having an integral dependent skirt extending around the periphery thereof, means for rotatably fastening said unitary frame on the upper end of said standard, spaced from said base and at least one pair of holes in said depending skirt extending inwardly of said top member parallel to said base;

bent spring rod means for supporting the selected items to be displayed, said rod means having a generally "U" shaped portion with opposing legs, an intermediate leg extending perpendicular from each of the opposing legs, and an arm extending freely from each of the intermediate legs in parallel to the associated one of said opposing legs, said arms being removably received in respective ones of a pair of spaced holes in said integral dependent skirt such that the "U" shaped portion is disposed freely in the space between said base and said integral dependent skirt, said rod means being removable from said holes to permit said items to be placed on or removed therefrom.

4,881,337
METHOD OF LINING BAIT
Donald N. Mehl, 5520 Dell La., Minnetonka, Minn. 55345
Filed Apr. 26, 1988, Ser. No. 186,368
Int. Cl.[4] A01K *97/00*
U.S. Cl. 43—4 **7 Claims**

1. Process of placing a fishing line in a fishing bait comprising the step of:

a. inserting a configured stylet with a point at one end, finger grasping member at another end, and a hole with substantially flattened diametrically opposed surfaces on all sides of the hole and on both sides about the hole of the stylet, the hole is located adjacent to the point, into the fishing bait and out of the fishing bait;

b. threading an end of the fishing line through the hole and having an overlapping portion of the fishing line whereby said flattened surfaces aids in the ease of threading a fish-

ing line through the stylet and back through the fishing bait;

c. pulling the stylet back through the bait with the fishing line in the hole; and,

d. removing the fishing line from the stylet.

4,881,338

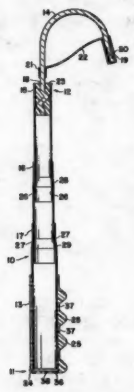
TELESCOPIC GAFF HOOK DEVICE

Jimmy R. Lung, Destin, Fla., assignor to Destin Machine, Inc., Destin, Fla.

Filed Nov. 7, 1988, Ser. No. 267,800

Int. Cl.[4] A01K *97/14*

U.S. Cl. 43—5 **16 Claims**



1. A gaff hook for use in fishing comprising a tubular member having a plurality of telescoping sections extending from a butt end to a tip end, a hand grip at said butt end, and a hook at said tip end, said hook having a shank and a point end, said shank being firmly, nonrotatably fixed in said tip end, a tubular cover having a closed end and an open end with open end slidable over said point of said hook a tubular keeper ring slidable over said shank of said hook and a tether member connected at one end to said cover and at the other end to said keeper ring.

4,881,339

METHOD OF AND APPARATUS FOR FISHING WITH A BACKWARDS HOOK

Clarence Wirkus, 13435 NW. Jay St., Andover, Minn. 55304

Filed Apr. 4, 1988, Ser. No. 177,092

Int. Cl.[4] A01K *83/00*

U.S. Cl. 43—42.04 **26 Claims**

1. An artificial fishing lure, comprising

(a) a body having a leading end with pulling means for connection to a fishing line;

(b) a hook having a floppy mounting to an aft portion of the body; and

(c) movable hook holder means mounted to and movable with respect to said body and engagable with said hook for

(1) normally holding said hook backwards with respect to said body, and for

(2) instantly releasing said hook to a typical trailing position upon disturbance of either said holder or said hook by a fish.

4,881,340

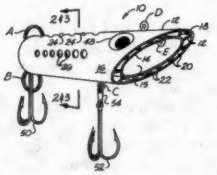
FISHING LURE WITH DOUBLE-WALLED ANNULAR REGION HAVING PLURAL PASSAGES

F. Darell Davis, West Columbia, S.C., assignor to American Angler Corporation, Columbia, S.C.

Filed Jan. 11, 1989, Ser. No. 295,909

Int. Cl.[4] A01K *85/00*

U.S. Cl. 42—42.06 **19 Claims**



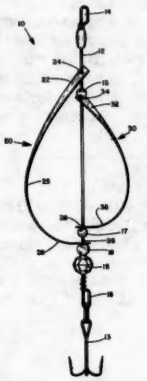
1. A fishing lure having a hollow generally longitudinal body comprising an inner tubular member and an outer tubular member spaced outwardly therefrom to define an annular space therebetween extending along the length of said body, said body being formed for varying orientation thereof as same is drawn through water, and said outer tubular member being formed with at least one opening transversely thereof for allowing water and air bubbles to escape outwardly from within said annular space, said lure further including a plurality of channel means, positioned in said annular space and extending along the length of said tubular members, for enhancing release of air bubbles and aiding the alluring effect.

4,881,341

SPINNER FISHING LURE

Larry A. Dickey, 5755 East River Rd., #1514, Tuscon, Ariz. 85715, and John J. Amsler, 3462 Dromedary Way, #1299, Las Vegas, Nev. 89115

Filed May 19, 1988, Ser. No. 195,907
Int. Cl.[4] A01K *85/00*
U.S. Cl. 43—42.12 **65 Claims**



1. A fishing lure comprising

(a) a shaft having means for connecting a fishing line to one end of the shaft for retrieving the lure during fishing,

(b) means for connecting a fishhook to the opposite end of the shaft,

(c) a first spinner comprising a generally rectangularly shaped half loop ribbon member having aperture means at each end thereof for rotatably mounting the first spinner to the shaft, said ribbon member being pitched at an angle to the shaft at the location at which said first spinner is mounted to the shaft,

(d) a second spinner comprising a generally rectangularly shaped half loop ribbon member having aperture means at each end thereof for rotatably mounting the second spinner to the shaft, said ribbon member being pitched at an angle to the shaft at the location at which said second spinner is mounted to the shaft, said angle being opposite to the angle of pitch of said first spinner,

whereby as the lure is retrieved during fishing the spinners will rotate about the shaft in opposite directions to each other so that the rotational forces of each spinner approximately cancel out.

4,881,342

PLANT SUPPORT DEVICE AND DISPLAY STAND THEREFOR

George W. Ferguson, 981 W. 99th Ave., Northglenn, Colo. 80021

Filed Jan. 19, 1988, Ser. No. 145,257
Int. Cl.[4] A01G *17/14*
U.S. Cl. 47—47 **5 Claims**

1. In a plant support device wherein a standard is inserted into the soil at the base of a growing plant for upward extension from the soil along the center portion of the plant, the improvement comprising:

a plurality of plant stem support members disposed in vertically spaced relation to one another on said standard, each said support member extending radially outward from said standard and having a hook shaped end portion at a free end of said support member into which a stem of said growing plant is inserted, each said support member having a thickened end in surrounding relation to said standard and tapering away from said thickened end into said hook shaped end portion, said thickened end and said hook shaped end portion joined by a straight wall portion, said hook shaped end portion defined by opposing walls, said opposing walls oriented at an acute angle to said

straight wall, and support means and said hook shaped end portion provided with correspondingly sized openings to interchangeably receive said standard.

4,881,343

SEED COLORANT

Takanori Sannan, Tokyo; Mitsutaka Seki, Kawaguchi; Shinya Tsuchida, Urawa, and Shojiro Horiguchi, Omiya, all of Japan, assignors to Dainichiseika Color & Chemicals Mfg. Co. Ltd., Tokyo, Japan

Division of Ser. No. 152,498, Feb. 5, 1988, Pat. No. 4,853,429.
This application Apr. 4, 1989, Ser. No. 333,003
Claims priority, application Japan, Feb. 14, 1987, 62-30700
Int. Cl.[4] A01C *1/06*
U.S. Cl. 47—57.6 **10 Claims**

1. Seeds colored with a colorant comprising:

an aqueous medium;

a dye and/or pigment; and

a binder resin composed of the salt of chitosan and an organic acid.

4,881,344

SLEEVE FOR PLANT GERMINATION SUBSTRATE

Günter Frey, Schliengen, and Rudolf Wagner, Heitersheim, both of Fed. Rep. of Germany, assignors to Firma Carl Freudenberg, Weinheim/Bergstr., Fed. Rep. of Germany

Filed Feb. 27, 1989, Ser. No. 316,087
Claims priority, application Fed. Rep. of Germany, Mar. 12, 1988, 3808320
Int. Cl.[4] A10G *9/02*
U.S. Cl. 47—77 **9 Claims**

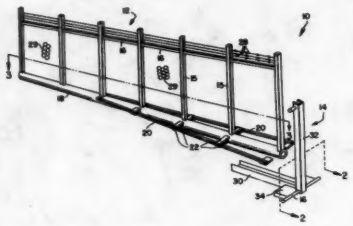
1. A sleeve adapted to be filled with a substrate for plant germination, having a tubular shape and consisting of a nonwoven, bonded fiber material having a specific weight of 15 to 50 g/m^2, treated with a polymer mass and with amounts of 0.1 to 3 g/m^2 of a fungicide, said fiber material comprising 50 to 80 percent by weight of cellulose fibers, 10 to 40 percent by weight of synthetic fibers with a size of 1.3 to 17 dtex, and 10 to 30 percent by weight of a fiber binding agent, said fiber material having an air passage porosity at 1.0 mbar of 1000 to 1600 liters per second per square meter, said polymer mass having 10 to 50 grams per square meter of a slow-release fertilizer with a grain size of less than 80 microns embedded therein.

4,881,345

VERTICALLY ROTATABLE GATE

Jerome Cyszewski, P.O. Box 1998, Billings, Mont. 59103

Filed Sep. 7, 1988, Ser. No. 241,910
Int. Cl.[4] E05D 7/00
U.S. Cl. 49—385 **4 Claims**



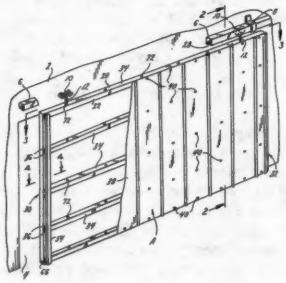
1. A vertically rotatable gate assembly having a top and bottom and rotatable about an axle comprising:
- a torsion beam having a first end and a second end, the torsion beam extending the length of the gate assembly along the bottom thereof;
- means for mounting the first end of the torsion beam to the axle;
- a bracing stringer having a first end and a second end;
- the first end of the bracing stringer being mounted to the torsion beam adjacent the first end of the torsion beam and spaced apart therefrom in a direction parallel to the longitudinal axis of the axle and the second end of the bracing stringer converging toward the second end of the torsion beam and secured to the torsion beam;
- a plurality of fence stiles, each having an end connected to the torsion beam and extending to the top of the gate assembly, the fence stiles together being positioned to form a plane fence surface;
- a fence mounted to the fence stiles on the plane fence surface and being supported by the fence stiles;
- whereby torsional forces on the fence are resisted by the torsion beam and forces transverse to the torsion beam are resisted by the bracing stringer.

4,881,346

DOOR AND METHOD OF FABRICATING THE SAME

Gordon S. Block, Winnebago, Ill., assignor to C. Hager & Sons Hinge Manufacturing Company, St. Louis, Mo.

Filed Jun. 20, 1988, Ser. No. 209,178
Int. Cl.[4] E06B 3/00; E05D 13/00
U.S. Cl. 49—501 **20 Claims**



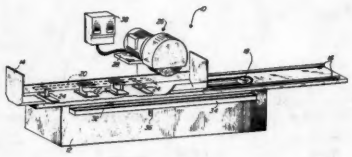
1. A door comprising: first and second vertical members located at the ends of the door, each vertical member having spaced apart front and rear walls and an end wall connecting the front and rear walls so that the vertical members in cross-section are generally channel-shaped, the vertical members being oriented with their end walls presented away from each other so that their hollow interiors open toward each other, each vertical member having a rib on at least its front or rear wall, each rib extending substantially the entire height of the vertical member on which it is located and projecting into the hollow interior of that member, each rib further being substantially continuous along the wall of the member on which it is located; a plurality of lateral members extended between the vertical members and at their ends being fitted into the hollow interiors of the vertical members, the lateral members at their ends having vertical slots which align with and receive the ribs on the vertical members, so as to interlock the vertical and lateral members; connecting means for securing the vertical members to the lateral members; and a siding material extended over and attached to the lateral members.

4,881,347

SKI REPAIRING MACHINE

Petrin Mario, 548 15 Ave., LaSalle, Quebec, Canada (H8P 2R9), and Petrin Blaise, 4470 Lafontaine, Montreal, Quebec, Canada (H1V 1P3)

Filed Jan. 27, 1988, Ser. No. 148,946
Int. Cl.[4] B24B 7/00
U.S. Cl. 51—5 R **18 Claims**



1. An apparatus for grinding the base of a ski, said base having a given contour, said apparatus comprising:
- a frame;
- a carriage for receiving said ski, said carriage being mounted to said frame for movement thereabout,
- means for supplying motive power in driving relationship with said carriage to impart a reciprocating movement to said carriage;
- a grinding tool mounted for movement to said frame, reciprocating movement of said carriage causing said grinding tool to engage said base in successive grinding strokes, during a grinding stroke said grinding tool moving with respect to said frame to follow the contour of said base;
- pressure control means coupled to said grinding tool for maintaining the grinding pressure thereof generally constant at various positions of said grinding tool with respect to said frame, thus allowing said grinding tool to exert a generally constant grinding pressure on said base while following the contour thereof;
- and further comprising a scraper means mounted to the frame for movement relative to said frame between an inoperative position and an operative position, wherein in said operative position said scraper means engages said base.

4,881,348

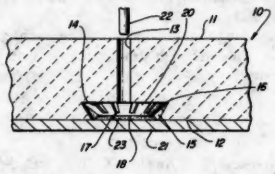
CERAMIC BRICK

Thomas E. Davis, Ann Arbor, Mich., assignor to Visuron, Inc., a Mich. Corp., Essexville, Mich.

Filed Jun. 10, 1988, Ser. No. 204,846
Int. Cl.[4] E04B 1/60
U.S. Cl. 52—127.7 **27 Claims**

1. An abrasion resistant weldable brick adapted to be welded to a weldable backing, said brick having inner and outer faces and a recess therein opening at the inner face of said brick in a

direction transverse to said inner face, said recess having an interior ceiling transverse to said direction and spaced from the opening at said inner face, said recess enlarging adjacent to said ceiling with respect to said opening to effect an insert receiving undercut, a weldable insert within said recess, said insert having a central base and means for interlocking said insert within said recess comprising portions of said insert extending from said base into said undercut and deformed into mechanical interlocking engagement with portions of said brick defining said undercut.



4,881,349

PANEL LOCKING SYSTEM

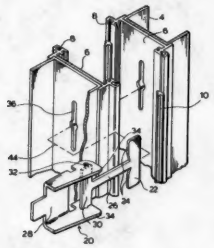
Mortimer Brown, Oakville, and John Hellwig, Toronto, both of Canada, assignors to Teknion Furniture Systems Inc., Downview, Canada

Filed May 25, 1988, Ser. No. 198,295

Claims priority, application Canada, May 29, 1987, 538353

Int. Cl.[4] E04B *2/82*

U.S. Cl. 52—127.11 **5 Claims**



1. In an office panelling system, a clamp for securing two panels each of which has a frame, said clamp comprising a first portion having a head and a shank, said head extending either side of said shank to form at least a 'T' shaped configuration, said shank at an end opposite said head including a pivoted lever and camming member which, in a first orientation, defines a certain distance between said head and said lever and camming member and is movable to a second position defining a reduced distance relative to said first orientation, said lever and camming member being shaped to pass through a point of minimum spacing between said first and second orientations to create a bias maintaining said lever and camming member in said second orientation when effecting a clamping action, wherein said head is generally planar and said shank and head act as a key which is inserted through slots in panels and rotated, once so inserted, to a clamping orientation with said head engaging an interior surface of the frame of an office panel with said camming member engaging an interior surface of the frame of an adjacent panel, and wherein said camming member includes two camming surfaces spaced either side of said shank and generally opposite panel engaging surfaces of said 'T' shaped head.

4,881,350

ANTI-EARTHQUAKE STRUCTURE INSULATING THE KINETIC ENERGY OF EARTHQUAKE FROM BUILDINGS

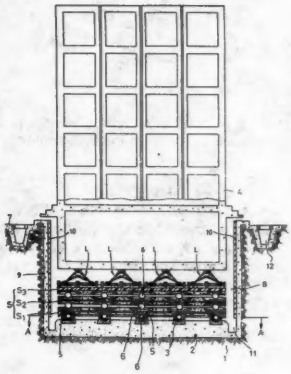
Chyuang-Jong Wu, 15, lane 47, Ta Tung Rd., Fay Sha Tsun, Sze Hu Hsiang, Yun Lin Hsien, Taiwan

Filed Apr. 6, 1989, Ser. No. 334,606

Claims priority, application Japan, Apr. 25, 1988, 63-102315

Int. Cl.[4] F16M *13/00*; E04H *9/02*

U.S. Cl. 52—167 R **12 Claims**



1. An anti-earthquake structure constructed between a building and the construction site thereof, comprising:

a plurality of supporting layers having upper and lower surfaces, both said upper and lower surfaces being provided with multiple ball seats;

a plurality of ball members correspondingly disposed on and pressed between said ball seats with extremely small rolling friction thereagainst;

a plurality of sliding block linkages disposed between the building and said supporting layers, said linkages including pivot blocks, multiple linkage bars pivoted on said pivot block, sliding blocks on which said linkage bars are pivoted, and guide means guiding said sliding blocks;

levers each having two ends and a fulcrum, to which said sliding block is opposed; and

buffer springs opposed to said lever for absorbing kinetic energy transmitted from said sliding blocks via lever motion.

4,881,351

SELF-SUPPORTING UNIT ELEMENT STAIRCASE

Wilfred Hamm, D-4330 Mulheim-Ruhr, Im, Wiesenggrund 28, Fed. Rep. of Germany

Filed Jan. 27, 1988, Ser. No. 149,130

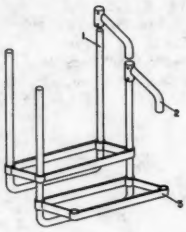
Claims priority, application Fed. Rep. of Germany, Jan. 27, 1987, 3702278

Int. Cl.[4] F04F *11/02*

U.S. Cl. 52—182 **7 Claims**

1. A staircase comprising a plurality of U-shaped supporting elements, each element having a horizontally extending base and vertically upwardly extending legs integrally connected to the base, a plurality of steps having opposed ends and marginal edges between said opposed ends and said marginal edges are longer than said opposed ends, means for clamping said step ends of each step to the legs of at least two of said U-shaped elements so that each step is supported above both bases of said

two U-shaped elements with said step marginal edges parallel said elements bases, said U-shaped elements being spaced vertically one relative to another so as to define a predetermined pitch or rise for successive steps in the staircase.

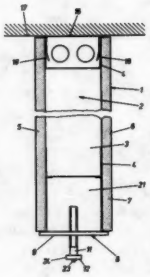


4,881,352

WALL PANEL ARRANGEMENT

Karl Glockenstein, Mautner Markhofg., Vienna, Austria (1110)

Filed Jul. 29, 1988, Ser. No. 226,107
Claims priority, application Austria, Jul. 30, 1987, 1932/87
Int. Cl.[4] E04H *1/00*
U.S. Cl. 52—239 **14 Claims**



1. A wall panel arrangement with wall panels for the interior structure of a building having a ceiling, comprising:

a bearing frame having first and second sides, upper and lower sides, and including first and second U shaped profiles, each said U shaped profile including spaced apart shanks;

first and second covering sheets attached respectively to the first and second sides of the bearing frame;

filling material, disposed between the first and second covering sheets for providing insulation;

a bracing member, disposed on the lower edge of the bearing frame, for compensating for dimensional differences between the wall panel and the building structure accommodating the wall panel;

at least one of the edges of the bearing frame being recessible relative to an edge surface of at least one of the covering sheet

the first U shaped profile of the bearing frame being disposed adjacent the lower edge of the bearing frame between the first and second covering sheets with;

a ceiling bearing member, defining a U shaped profile having shanks separated by a web, mounted to the ceiling;

each of said shanks having a length and an end, the shank ends being bent at about mid-shank length towards the other shank to define an acute angle with respect to a median profile plane;

the shanks of the second U shaped profile of the bearing frame being spaced apart a distance greater than the distance separating the shanks of the ceiling bearing member, the second U shaped profile being disposed adjacent the upper edge of the bearing frame between the first and second covering sheets such that the shanks of the ceiling bearing member extend into a space between the shanks of the second U shaped profile and are retained therein by the shanks of the second U shaped profile; and

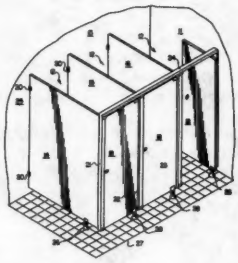
means for securing the web of the ceiling bearing member to the ceiling, for concealably mounting the wall panel to the building structure.

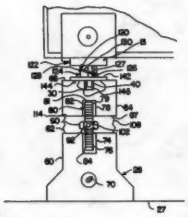
4,881,353

CUBICLE

Gregory G. Braendel, Los Angeles, Calif.; David M. Goodwin, Pyrford, England, and Brian J. Moore, Wirral, United Kingdom, assignors to Braendel & Associates, Inc., Sun Valley, Calif.

Filed Apr. 21, 1987, Ser. No. 40,893
Int. Cl.[4] E04H *1/2*
U.S. Cl. 52—239 **17 Claims**





1. A cubicle construction comprising:

an upright rear planar means for supporting edges of normally disposed upright panel means;

plural spaced apart planar side means for defining sides of a cubicle, the side means coupled to the upright rear planar means;

vertical post means for engaging the plural spaced apart planar panels means, the vertical post means defining an upper portion;

elongated headrail means for structurally engaging the post means, the elongated headrail means coupled at the upper portion of the post means, extending normal to the planes of the side means;

door means pivotally mounted about an axis adjacent, parallel and spaced apart from the vertical post means, the door means comprising upper pivot means for pivotally coupling the door to the cubicle at an upper portion of the door, and downwardly extending pivot means for pivot-

ally coupling the door at the lower portion of the door; and

foot means for pivotally supporting the door means, the foot means having an adjustable length; the foot means characterized by

threaded means for adjusting the length of the foot means, the threaded means coupled to the foot means;

first fastener means for fixing the length adjustment of the foot means, the first fastener means coupled to the threaded means; and

second fastener means coupled to the first fastener means for engaging the threaded means to thereby prevent further adjustment of the length of the foot means despite rotation of the door means about the pivot.

4,881,354

SECURITY GRILLE AND MANUFACTURING METHOD

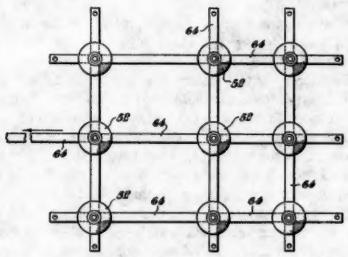
Alan D. Pitt, Tree Tops, 19 Forest Close, Bewdley, DY12 2UF, England

Filed Jun. 3, 1988, Ser. No. 202,197

Claims priority, application United Kingdom, Jun. 26, 1987, 8715037; Mar. 2, 1988, 8804977

Int. Cl.[4] E04C *2/38, 2/42*

U.S. Cl. 52—665 **12 Claims**



1. A security grille adapted for fixing to a structure so as to extend across an aperture therein, said grille including at least one pair of rods whose corresponding one ends are adapted to be fixed to said structure and whose corresponding other ends are adapted to be connected to one another by two initially separate portions of a device which are subsequently so permanently joined to one another as to clamp said other ends between them, each of said two separate portions including a central portion and a plurality of channel-shaped limbs extending radially outwardly from said central portion, each limb having a proximal end attached to said central portion and a free distal end, said other ends of said pair of rods being placed between an associated pair of inwardly facing channel-shaped limbs comprising one limb from each of said two separate portions, the respective free distal ends of said associated pair of limbs being canted toward one another with respect to said respective central portions, whereby the respective free distal ends exert a clamping force on the rod ends when the two separate portions of the device are joined together.

4,881,355

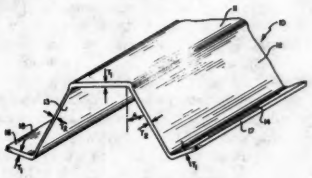
COLD ROLL-FORMED STRUCTURES AND METHOD AND APPARATUS FOR PRODUCING SAME

George F. Bosl, Westlake; Patrick M. Kelly, Cleveland; Dennis A. Alvarez, Euclid, all of Ohio; Gale Sauer, Sinclairville, N.Y., and Joseph A. Hocevar, Willoughby Hills, Ohio, assignors to USG Interiors, Inc., Chicago, Ill.

Division of Ser. No. 19,214, Feb. 26, 1987, Pat. No. 4,770,018, and a continuation-in-part of Ser. No. 838,918, Mar. 12, 1986, abandoned. This application May 23, 1988, Ser. No. 197,622

Int. Cl.[4] E04C *3/32*

U.S. Cl. 52—738 **16 Claims**



1. A substantially straight elongated strip of sheet metal formed by cold-rolling from a strip of sheet metal having a substantially uniform first thickness, comprising a first longitudinal portion spaced from at least one lateral edge of said strip, and a second longitudinal portion interconnected between said first longitudinal portion and said at least one edge of said strip, said second longitudinal portion including a plurality of narrow shear-deformed laterally adjacent separately formed bands of reduced thickness cooperating to provide said second longitudinal portion with a thickness substantially less than the thickness of said first portion and a width substantially equal to the sum of the width of said bands.

4,881,356

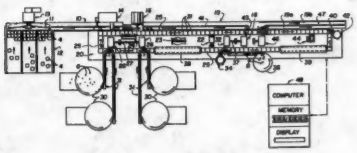
APPARATUS FOR ASSEMBLING MULTI-PART ARTICLE

William E. Beezer, and Earl F. Beezer, both of Mahwah, N.J., assignors to Stelron Components, Mahwah, N.J.

Filed Jan. 25, 1988, Ser. No. 148,357

Int. Cl.[4] B65B *3/04, 43/38, 43/56, 7/26*

U.S. Cl. 53—53 **29 Claims**



1. An apparatus for assembling a multi-part article, having a base with at least one receptacle for receiving a component, and a lid hinged to the base for movement from a closed position, covering the receptacle to an open position exposing the receptacle, the apparatus comprising:

an assembly chassis having an endless guideway;

a plurality of pucks mounted for movement on said guideway to a plurality of accurately located stations in sequence around said guideway, each puck having a site for receiving the base of an article to be assembled;

puck drive means for indexing each puck from one station to the next around said guideway;

article loading means for loading an article into the site of each puck on said guideway at an article loading station along said guideway;

lid opening means for opening the lid of each article at an opening station along said guideway;

component loading means for loading a component into the receptacle of each article at a component loading station along said guideway;

lid closing means for closing the lid of each article at a lid closing station along said guideway;

sensing means adjacent said guideway, at a location along said guideway between said opening station and an article unloading station, for sensing the readiness of each article, for successfully receiving a component;

computing means connected to said sensing means for keeping track of each puck as it moves from station to station along said guideway, said computing means being connected to said sensing means for determining whether each article is ready to receive a component or not, and, upon receiving a signal from said sensing means indicating that an article is not ready to receive a component, identifying the puck carrying that article as containing an unacceptable article; and

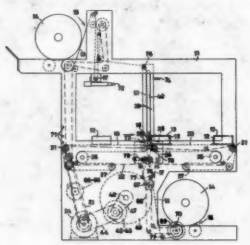
article unloading means at said article unloading station along said guideway, for unloading unacceptable articles onto an unacceptable article pathway and all remaining articles onto an acceptable article pathway, said computing means being connected to said article unloading means for controlling said article unloading means to unload articles from pucks identified as carrying unacceptable articles onto said unacceptable pathway, and all remaining articles onto said acceptable article pathway when the pucks carrying said articles reach said article unloading station.

4,881,357

PACKAGING MACHINE FOR THE CONTINUOUS PACKAGING OF PRODUCTS HAVING A VARIABLE SIZE

Aris Ballestrazzi, and Lamberto Tassi, both of Savignano Sul Panaro, Italy, assignors to Sitma-Societa Italiana Macchine Automatiche, S.p.A., Spilamberto, Italy

Filed Jul. 25, 1988, Ser. No. 223,915
Claims priority, application Italy, Aug. 27, 1987, 21732 A/87
Int. Cl.[4] B65B *9/02*
U.S. Cl. 53—64 **12 Claims**



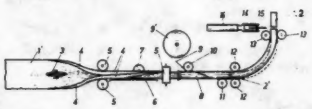
1. Packaging machine for the continuous packaging of products having a variable size, of the type comprising a framework fitted with conveyor means for conveying the produts to be packaged, a transversal welding unit for the transversal welding of a plastic material having the form of a continuous sheet sduitable for wrapping said products to be packaged, wherein said continuous-sheet material is fed by a couple of bobbins positioned on relevant unwinding units and free ends of said bobbins are transversely welded so as to form a single continuous sheet, with said conveyor means being a first conveyor belt and a second conveyor belt respectively positioned upstream and downstream said welding unit, which is transversal relatively to the direction of unwinding of said packaging material and which is composed by an upper, vertically movable, welding bar, which moves in a transit describing an inverted trapezoid and by a lower welding bar, stationary, and positioned at the same level as of said first conveyor belt and second conveyor belt, with relevant motor means and actuator means being furthermore provided, characterized in that said welding unit is positioned on a horizontally translatable car, with said car bearing, on opposite sides relatively to said welding unit, a return roller of said first conveyor belt and a return roller of said second conveyor belt, wherein said first conveyor belt and said second conveyor belt run along a closed-loop path and are provided with a belt tightening device suitable for enabling them to correctly operate, a single centralized motor means being provided, which, through a first transmission, determines the continuous revolution of said conveyor belts, and, with the interposition of a brake-clutch unit, selectively actuated by sensor means monitoring the position of said products on said conveyor belts, drives an intermediate shaft to revolve in order to actuate a cam for the vertical movement of said upper welding bar and for actuating a crank and slotted link for driving the horizontal reciprocating of said car.

4,881,358

METHOD OF PACKAGING ARTICLES OF A COMPRESSIBLE MATERIAL

Anders Berg, Tranas, Sweden, assignor to Shampoo Sponge International B.V., Berkel en Rodenrijs, Netherlands

Filed Jul. 9, 1984, Ser. No. 628,745
Claims priority, application Sweden, Jul. 22, 1983, 8304094
Int. Cl.[4] B65B *1/24, 13/20, 63/04*
U.S. Cl. 53—399 **3 Claims**



1. A method of packaging a compressible blank such as a sponge or the like in a state of compression with a removable foil, comprising folding the blank lengthwise along a transverse centre line a first time, folding the once folded blank lengthwise along a transverse centre line of the folded blank a second time, advancing the blank thus folded twice lengthwise through a piece of pipe, forming and welding a web of foil into a tubular cover around the outer side surface of the pipe to enclose coaxially the discharge end of sid pipe and said twice-folded blank, advancing said twice-folded blank and the encircling tubular cover beyond the discharge end of said piece of pipe, and cutting said blank and the encircling tubular cover into pieces of a predetermined length, said cut-off pieces thus forming an article packaged in said tubular cover, the surface of said article exposed at the two ends of said tubular cover corresponding to the lengthwise marginal edges of the finished article in its non-folded condition, said cover being removable to access said blank for its expansion and use.

4,881,359

METHOD FOR MAKING A VACUUM SKIN PACKAGE

Henry G. Schirmer, Spartanburg, S.C., assignor to W. R. Grace & Co., Duncan, S.C.

Division of Ser. No. 115,458, Oct. 31, 1987, Pat. No. 4,815,602.
This application Nov. 4, 1988, Ser. No. 267,054
Int. Cl.[4] B65B *11/52, 31/00*
U.S. Cl. 53—427 **3 Claims**

1. A method for packaging a moisture-sensitive product comprising:

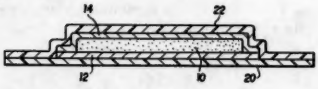
(a) placing the product to be packaged on a first metallic sheet;

(b) placing a second metallic sheet having outer and inner non-heat sealable metallic surfaces over said product;

(c) placing the first metallic sheet, product, and second metallic sheet on a supporting member such that the prod-

uct is in contact with the inner metallic surfaces of the respective sheets;

(d) applying a top thermoplastic web over the second metallic sheet and in sealing arrangement with the supporting member, by a vacuum skin packaging process; and



(e) simultaneously with step d), clamping the first and second metallic sheets together to substantially mechanically enclose the product between the two metallic sheets.

4,881,360

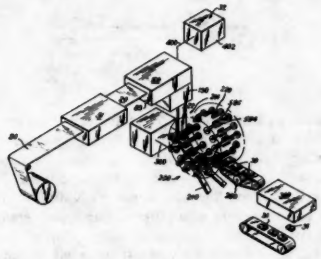
HIGH CAPACITY PACKAGE SEAL, SEVER, AND BRICK APPARATUS AND METHOD

Daryl Konzal, Colgate, and Gunars Salnajs, Milwaukee, both of Wis., assignors to International Paper Company, Purchase, N.Y.

Division of Ser. No. 942,986, Dec. 17, 1986, Pat. No. 4,817,366. This application Nov. 23, 1988, Ser. No. 275,730

Int. Cl.[4] B65B *61/24, 9/08, 51/22, 51/30*

U.S. Cl. 53—439 **13 Claims**



1. Apparatus for controlling the volume of product in an advancing polyfoil tube including a plurality of clamping means for sequentially transversely clamping the tube at spaced intervals as the tube advances, each clamping means having a first member and a second member pivotally connected together having an open and unclamped position and a closed and clamped about the tube position, comprising;

means for controlling the orientation of each clamping means as it closes about the tube at a predetermined location to adjust the length of the advancing tube to be transversely clamped;

a pair of fingers oriented to contact the polyfoil tube before each clamping means closes to adjust the configuration of the tube and the volume of product in the tube; and

a first boundary surface extending from one of the first or second members of each clamping means, and a second boundary surface extending from the other of the first or second members of each clamping means, said first and second boundary surfaces cooperating to contact the tube and confine the tube to a predetermined configuration as each clamping means closes about the tube to control the amount of product in the tube as the tube is clamped.

4,881,361

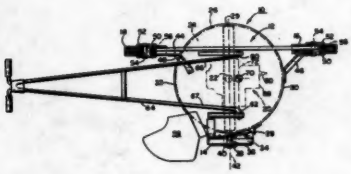
WHEELED VEHICLES FOR GROUND WORK

John F. Dalton, Devon, Pa., assignor to Cameron Constructors, Inc., Newark, Del.

Filed Sep. 28, 1987, Ser. No. 101,514

Int. Cl.[4] A01O *34/68*

U.S. Cl. 56—17.5 **22 Claims**



1. A work vehicle comprising:

a chassis having generally front, rear, first lateral and second lateral sides;

three ground-contacting wheels coupled with the chassis for supporting, turning and moving the vehicle on the ground;

a first one of the three wheels being positioned generally on the first lateral side of the chassis, the first wheel being mounted for rotation about only a generally horizontal, first axis fixedly extending laterally towards the second lateral side;

a ground-working implement coupled with the chassis for working at least generally beneath the second lateral side of the chassis generally opposite the first wheel;

a second one of the three wheels being positioned generally to a front side of the first axis and being mounted to the chassis for rotation about two axes including a generally vertical pivot axis;

a third one of the three wheels being positioned generally to a rear side of the first axis and being mounted to the chassis for rotation about two axes including a generally vertical pivot axis; and

the vehicle having a center of gravity positioned among the three wheels, the first wheel being spaced laterally from the center of gravity towards the first lateral side a first distance and the second wheel and third wheel each being spaced laterally from the center of gravity towards the second lateral a side distance approximately one-half the first distance to distribute substantially the same portion of the weight of the vehicle on each of the three wheels.

4,881,362

MOBILE VACUUM SYSTEM FOR USE WITH A RIDING TRACTOR MOWER

Richard W. Parker; James P. Beery; Donald L. Boblitt, and Robert L. Starr, all of Springfield, Ohio, assignors to Parker Sweeper Company, Springfield, Ohio

Continuation of Ser. No. 698,700, Feb. 6, 1985, Pat. No. 4,761,943. This application Aug. 8, 1988, Ser. No. 229,651

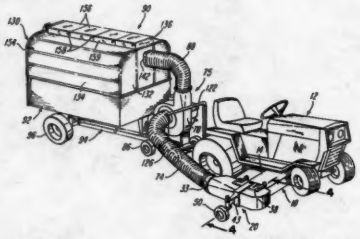
The portion of the term of this patent subsequent to Aug. 9, 2005, has been disclaimed.

Int. Cl.[4] A01D *34/12*

U.S. Cl. 56—202 **22 Claims**

1. A mobile vacuum system in combination with a rotary mower including a deck having a discharge portion defining an outlet for discharging cut grass, leaves and other debris, said system comprising a power driven vacuum-blower unit having an inlet and an outlet, a hollow boot having a generally vertical first wall portion defining an inlet and a second wall portion defining an outlet, a flexible hose connecting said outlet of said boot to said inlet of said vacuum-blower unit, connecting means mounted on said deck and positioning said first wall portion in horizontally spaced relation to said discharge portion of said deck with said inlet of said boot opposing said

outlet of said deck, said connecting means including a pivot connection providing for pivoting said boot on a generally horizontal axis relative to said deck, and said first wall portion defining said inlet of said boot cooperating with said discharge portion of said deck to define a substantial air suction gap



between said discharge portion of said deck and said first wall portion substantially around said discharge portion of said deck to provide for an envelope flow of air into said boot around said discharge portion of said deck to assure a continuous flow of debris from said mower to said vacuum-blower unit.

4,881,363

MOWING MACHINE

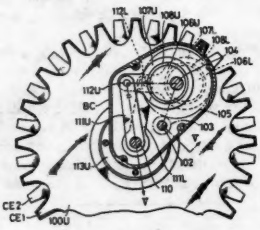
Akio Terai, Machida; Junichi Yoshino, Tokyo; Shinroku Satsumi, Machida, and Mitsuru Taniguchi, Tokyo, all of Japan, assignors to Kamatsu Zenoah, Co., Tokyo, Japan

Filed Sep. 21, 1987, Ser. No. 86,496

Claims priority, application Japan, Aug. 26, 1986, 61-198226; Jul. 6, 1987, 62-102664; Jul. 6, 1987, 62-102665

Int. Cl.[4] A01D *34/76, 34/68*

U.S. Cl. 56—255 **4 Claims**



1. A mowing machine comprising:

(a) motive power source;

(b) a pair of superposed pivotal cutting wheels each provided with a number of grass cutting edges; and

(c) means for converting a rotational motion supplied from said motive power source into two pivotal motions to drive said pivotal cutting wheels in two mutually different rotational directions, said rotational motion converting means comprising:

a casing (BC);

a cam shaft (**104**) rotatably driven by said motive power source within said casing;

first and second circular and eccentric cams (**106U,106L**) fixed to said cam shaft in radially symmetrical positional relationship to each other with respect to a center of said cam shaft;

first and second annular connecting rods (**107U, 107L**), each slidably fitted to each outer periphery of said first and second circular and eccentric cams, respectively;

a pivotal cutter wheel shaft (**110**) having at one end thereof a first arm (**111U**) pivotally connected to an end of said first annular connecting rod (**107U**) and at the other end thereof a first pivotal cutter wheel (**100L**); and

a cylindrical member (**120**) loosely and coaxially fitted to said pivotal cutter wheel shaft, said member having at a middle thereof a second arm (**111L**) pivotally connected to an end of said second annular connecting rod (**107L**) and at one end thereof a second cutter wheel (**100U**) in such a way that said two pivotal cutting wheels are concentrically superposed with each other.

4,881,364

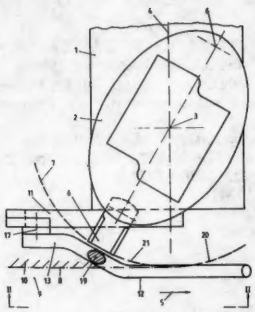
SEPARATING DEVICE FOR REAPERS WITH CUTTER PLATES DRIVEN TO ROTATE ABOUT VERTICAL AXES

Hans Grenzebach, Gemunden, Fed. Rep. of Germany, assignor to Friedrich Mortl Schleppergerate Bau GMBH & Co. KG., Gemunden, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 892,844, Aug. 4, 1986, abandoned. This application Jul. 29, 1988, Ser. No. 225,893

Int. Cl.[4] A01D *63/00*

U.S. Cl. 56—314 **12 Claims**



1. A separating device for use on crop reapers having cutter plates rotatable about vertical axes defining a vertical plane, with the cutter plates defining a cutting plane, the outermost cutter plate further defining a cutting track between cut and uncut crop material, and the vertical plane dividing the cutting circle of the outermost plate into forward and rear semicircles, said separating device comprising means for causing the outermost plate to make a vertical cut in a previously cut area defined by the rear semicircle and within the cutting track and a horizontal cut independent of said vertical cut in an uncut area defined by the forward semicircle.

4,881,365

ASSEMBLY APPARATUS FOR TRUCK LINKS

Yasumitsu Moriki, Tokyo, and Hirotomo Numakura, Kawasaki, both of Japan, assignors to Maruma Jyusharyo Kabushiki Kaisha, Tokyo, Japan

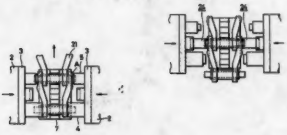
Filed Jan. 6, 1989, Ser. No. 295,042

Int. Cl.[4] B21L *19/00*

U.S. Cl. 59—7 **4 Claims**

1. Apparatus for assemblying link chains of the type having paired links joined together with cross pins joining successive pairs of chain links longitudinally, the chain links having a pitch corresponding to a distance between successive cross pins connecting paired chain links, the apparatus comprising a press having two ram heads cyclically operable toward each other from a retracted position to a position closer to each other and cyclically retracted to said retracted position, trolley means disposed for travel between the opposed press ram heads, means for cyclically advancing the trolley means in a direction forwardly three half pitches of a link successively and then in a reverse direction one half pitch and cyclically in

timed relationship with the cyclically operable rams heads of the press, the trolley means being disposed stationary between the ram heads each time the ram heads are operated toward each other, said trolley means having transport means for receiving and transporting cross pins spaced thereon successively a distance of a pitch of a link corresponding to the distance between successive cross pins in the assembled link chain, the individual ram heads having means for each transporting a respective link and for placing corresponding links



respectively on opposite ends of each successive pair of cross pins while the trolley means is stationary between the two ram heads for forming successive paired links, said ram heads having means for fixing individual retainer rings on corresponding opposite ends of a corresponding cross pin joining longitudinally a pair of successive paired links when the transport means is stationary between ram blocks each time after having moved in said reverse direction one half pitch, and the retainer rings retaining the successive paired links in assembly on corresponding cross pins.

4,881,366

CLEAN ELECTRIC POWER GENERATION PROCESS

Trevor W. Nurse, Herts, United Kingdom, assignor to Humphreys & Glasgow Ltd., London, England

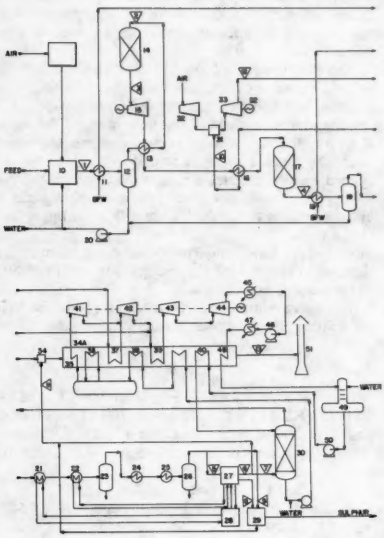
Continuation of Ser. No. 90,094, Aug. 27, 1987, abandoned. This application Feb. 13, 1989, Ser. No. 309,966

Claims priority, application United Kingdom, Aug. 29, 1986, 8620919; Nov. 27, 1986, 8628429

Int. Cl.[4] F02C *3/28*

U.S. Cl. 60—39.07 **5 Claims**

1. A process for the production of power from a carbonaceous fuel, which comprises partially oxidizing the fuel with oxygen or an oxygen-containing gas to yield a gas stream containing carbon monoxide at supra-atmospheric pressure, directly downstream of the oxidizing step quenching said gas stream with water, passing the quenched gas stream through a boiler in which the gas stream is cooled, thereby raising steam in the boiler, separating water from the cooled gas stream, ensuring that the gas stream is at sufficient temperature to initiate an exothermic shift reaction, and then subjecting the gas stream to a carbon monoxide shift reaction whereby at least some of the carbon monoxide is converted into carbon dioxide with a consequent evolution of heat, and directly downstream of the shift reaction expanding the gas stream to produce power, and then using at least a major portion of the



expanded stream as a fuel for a gas turbine to produce additional power.

4,881,367

GAS TURBINE ENGINE

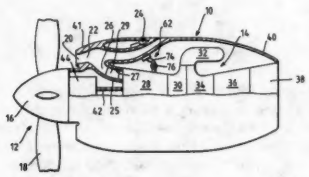
Richard J. Flatman, Derby, England, assignor to Rolls-Royce PLC, London, England

Filed Feb. 19, 1988, Ser. No. 157,942

Claims priority, application United Kingdom, Apr. 14, 1987, 8708859

Int. Cl.[4] F02C *3/32*

U.S. Cl. 60—39.07 **12 Claims**



1. A turbopropeller gas turbine engine comprising at least one propeller, a gas generator, and intake means,

the at least one propeller being positioned upstream of the gas generator,

the gas generator comprising a compressor and a gas generator casing,

the intake means supplying air to the gas generator being positioned downstream of the at least one propeller, the intake means comprising at least one intake opening formed in the gas generator casing and an associated inlet duct extending from the intake opening to the gas generator, the intake duct including:

separating means for removing foreign bodies from the air

supplied to the gas generator, the separating means including a separating duct comprising:

a mixing duct, connected to said intake duct for receiving foreign bodies, the mixing duct having a tubular wall and having a length to diameter ratio of between two and five;

a transition duct connected to said mixing duct, downstream of said mixing duct;

an outlet duct connected to said transition duct, downstream of said transition duct, the outlet duct having an outlet opening and being of rectangular cross-section;

ejector means to produce a fluid flow through the separating duct for drawing foreign bodies through the separating duct, the ejector means comprising a plurality of equi-spaced ejector nozzles arranged circumferentially in the mixing duct wall, the compressor supplying air to the ejector nozzles to produce a fluid flow through the separating duct,

conduit means fluidly interconnecting the compressor and the ejector nozzles for supplying air from the compressor to the ejector nozzles, and

a control valve controlling the flow of air from the compressor to the ejector nozzles through the conduit means.

4,881,368

DOUBLE AIR-FUEL RATIO SENSOR SYSTEM HAVING IMPROVED EXHAUST EMISSION CHARACTERISTICS

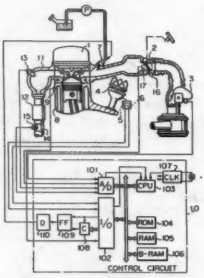
Takayuki Demura, Mishima, and Kohei Igarashi, Susono, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Feb. 5, 1988, Ser. No. 152,928

Claims priority, application Japan, Feb. 9, 1987, 62-026339; Mar. 6, 1987, 62-050324

Int. Cl.[4] F02D *41/14*; F01N *3/20*

U.S. Cl. 60—274 **86 Claims**



1. A method for controlling an air-fuel ratio in an internal combustion engine having a catalyst converter for removing pollutants in the exhaust gas thereof, and upstream-side and downstream-side air-fuel ratio sensors disposed upstream and downstream, respectively, of said catalyst converter, for detecting a concentration of a specific component in the exhaust gas, comprising the steps of:

determining whether or not all air-fuel ratio feedback control conditions for said downstream-side air-fuel ratio sensor are satisfied;

calculating an air-fuel ratio correction amount in accordance with the outputs of said upstream-side and downstream-side air-fuel ratio sensors when all of said air-fuel ratio feedback control conditions are satisfied;

determining whether or not the output of said downstream-side air-fuel ratio sensor is reversed;

lowering a speed of renewal of said air-fuel ratio correction amount in accordance with the output of said downstream-side air-fuel ratio sensor after all of the air-fuel ratio feedback control conditions for said downstream-side air-fuel ratio sensor are satisfied and until the output of said downstream-side air-fuel ratio sensor is reversed; and

adjusting an actual air-fuel ratio in accordance with said air-fuel ratio correction amount.

4,881,369

EXHAUST GAS PURIFYING APPARATUS

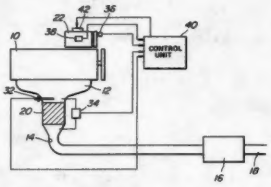
Nobukazu Kanesaki, Kanagawa, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed May 26, 1987, Ser. No. 53,741

Claims priority, application Japan, May 27, 1986, 61-78773

Int. Cl.[4] F01N *3/02*

U.S. Cl. 60—285 **8 Claims**



1. An exhaust gas purifying apparatus for use in an internal combustion engine into which fuel is injected at a timing, the engine having an exhaust system through which exhaust particles are discharged from the engine to the atmosphere, comprising:

catalytic trap means disposed in the exhaust system for collecting the exhaust particles and burning the collected exhaust particles;

first sensor means sensitive to engine exhaust gas temperatures for providing a signal indicative of a sensed engine exhaust gas temperature;

second sensor means sensitive to pressure differentials across the catalytic trap means for providing a signal indicative of a sensed pressure differential;

means sensitive to engine operating conditions for producing signals indicative of sensed engine operating conditions; and

a control unit responsive to the sensed engine operating condition indicative signals for controlling the fuel injection timing, the control unit including means responsive to the signals from the first and second sensors for retarding the fuel injection timing when the engine exhaust gas temperature is in a predetermined range and the sensed pressure differential exceeds a reference value.

4,881,370

EXHAUST DEVICE FOR OUTBOARD MOTOR

Yoshihiro Sakurai; Yoshihide Fukuda, and Kouji Abe, all of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Feb. 2, 1988, Ser. No. 151,524

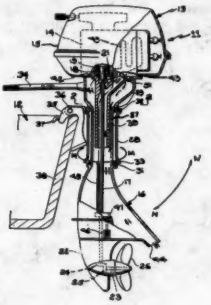
Claims priority, application Japan, Feb. 10, 1987, 62-29223

Int. Cl.[4] F01N *7/12*; B63H *21/26*

U.S. Cl. 60—310 **25 Claims**

1. An outboard motor construction comprised of a swivel bracket to be affixed to the transom of an associated watercraft, a power head containing an internal combustion engine having an output shaft, a drive shaft housing depending from said power head and containing a generally vertically extending drive shaft driven by said engine output shaft, a lower unit affixed to the lower end of said drive shaft housing and carrying propulsion means and means for driving said propulsion means from the lower end of said drive shaft, bearing means between said drive shaft housing and said swivel bracket for supporting said drive shaft housing for steering movement through substantially 360 degrees relative the transom of the associated watercraft, and an exhaust pipe affixed at its upper

end to said engine and extending from said engine downwardly into said drive shaft housing and terminating at a position therein below said bearing means and above said lower unit for discharging exhaust gases from said engine to the atmosphere



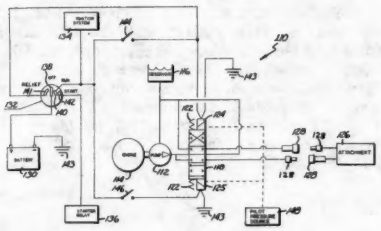
through said drive shaft housing, the lower end of said exhaust pipe being out of heat exchanging relationship with said drive shaft housing by being spaced therefrom for precluding the transfer of heat from said exhaust gases to said bearing means.

4,881,371

AUXILIARY COUPLER PRESSURE RELIEF HYDRAULIC SYSTEM WITH PUMP DRIVE IGNITION SWITCH RELIEF

Thomas Q. Haeder, Lisbon, and William C. Shelbourn, Bismarck, both of N. Dak., assignors to Clark Equipment Company, South Bend, Ind.

Filed Jul. 26, 1988, Ser. No. 224,165
Int. Cl.[4] F15B *13/043, 21/08;* F04B *49/02, 49/06*
U.S. Cl. 60—431 **5 Claims**



4. An auxiliary coupler pressure relief hydraulic system for a mobile vehicle, including:

a battery;

an engine;

an engine ignition system;

a reservoir of hydraulic fluid;

a pump coupled to the engine and reservoir for providing hydraulic fluid under pressure;

coupler means coupling hydraulic fluid to an attachment;

a pilot pressure source;

an electro-hydraulic spool valve coupled to the pilot pressure source and connected in a hydraulic circuit between the pump and the coupler means, for controlling the flow of hydraulic fluid to the coupler means in response to valve actuating signals;

auxiliary control switch means coupled to the spool valve for providing attachment control valve actuating signals; and

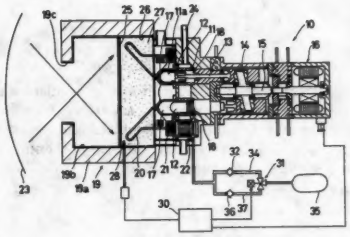
an operator actuated ignition switch having RUN, OFF and RELIEF positions for controlling the flow of electricity from the battery to the engine ignition system and the spool valve, wherein the ignition switch provides pressure relief valve actuating signals to the spool valve when the ignition switch has been switched to its RELIEF position and while the engine RPM is decreasing to zero.

4,881,372

STIRLING ENGINE

Yoshihiro Naito, Nagoya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Feb. 28, 1989, Ser. No. 316,853
Claims priority, application Japan, Feb. 29, 1988, 63-048084
Int. Cl.[4] F02G *1/04*
U.S. Cl. 60—521 **8 Claims**



1. A Stirling engine comprising;

heater means for collecting solar radiation energy,

a heater tube disposed in said heater means and connecting an expansion space and a compression space through a regenerator and a cooler;

a transparent partition disposed in said heater means and defining a closed space within which said heater tube is located;

a heat storage material positioned in said closed space;

temperature detecting means for detecting a temperature of said heat storage material;

pressure regulating means for regulating a pressure of a working gas in a working space from said expansion space to said compression space; and

control means for controlling said pressure regulating means in response to a signal from said temperature detecting means.

4,881,373

PULSE COMBUSTION DEVICE

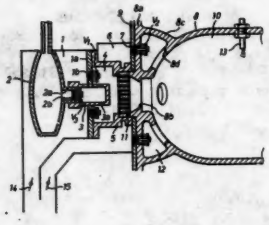
Shigeki Yamaguchi; Norio Ohiwa, and Katsusuke Ishiguro, all of Nagoya, Japan, assignors to Paloma Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Apr. 25, 1988, Ser. No. 185,423
Int. Cl.[4] F23R *7/00*
U.S. Cl. 60—732 **13 Claims**

1. A pulse combustion device comprising a housing forming therein a combustion chamber in which pulse combustion of a mixture of gaseous fuel and air takes place, a cylindrical support member coupled with said housing to form a mixing chamber in open communication with said combustion chamber, and a gas container arranged to store an amount of gaseous fuel and connected to said mixing chamber to supply the gaseous fuel therefrom into said combustion chamber through said mixing chamber,

wherein the pulse combustion device further comprises an air intake system composed of a primary air supply system including means for supplying primary air into said mixing chamber and means for adjusting a supply amount of the primary air in such manner as to create a rich mixture of gaseous fuel and primary air in said mixing chamber, and a secondary air supply system including means for supply-

ing secondary air into said combustion chamber and means for adjusting a supply amount of the second air to be mixed with the rich mixture supplied into said combustion chamber from said mixing chamber, whereby valve



means for regulating flow of said rich mixture and said secondary air are controlled according to actuation of ignition means for burning the mixture in the combustion chamber, thereby providing pulse combustion of the mixture in the combustion chamber.

4,881,374

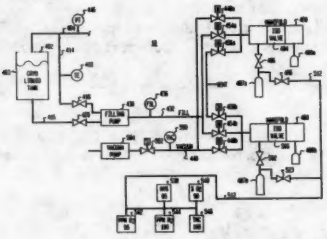
AUTOMATED CYLINDER TRANSFILL SYSTEM AND METHOD

Paul A. Mattiola, Coopersburg, and James Van Ommeren, Werley's Corner, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Division of Ser. No. 111,532, Oct. 20, 1987. This application Mar. 8, 1989, Ser. No. 320,745

Int. Cl.[4] F17C *13/00*

U.S. Cl. 62—50.6 **8 Claims**



1. A system for filling gas storage devices containing substance prior to filling in a filling station having a storage tank containing liquefied gas comprising:

vacuum means coupled to a gas storage device for removing the substance from the gas storage device prior to filling thereby evacuating the gas storage device;

a vacuum means including vacuum line means for conducting the removed substance from the gas storage device during the evacuation;

analyzer means coupled to the vacuum line means and in fluid communication with the removed substance for detecting the presence of at least one predetermined substance in the removed substance; and

the analyzer means including means for providing a signal in response to the detecting.

4,881,375

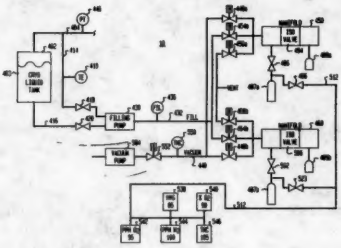
AUTOMATED CYLINDER TRANSFILL SYSTEM AND METHOD

Paul A. Mattiola, Coopersburg, and James VanOmmeren, Werley's Corner, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Division of Ser. No. 111,532, Oct. 20, 1987. This application Mar. 8, 1989, Ser. No. 320,730

Int. Cl.[4] F17C *13/00*

U.S. Cl. 62—50.6 **11 Claims**



1. A method for preventing cavitation of a pump in a filling station having a storage tank containing liquefied gas for loading into a gas storage device, the pump having a pump motor, comprising the steps of

(a) supplying liquefied gas to the pump for cooling the pump;

(b) sensing the pressure of the storage tank;

(c) sensing the temperature of the cooled pump; and

(d) starting the pump motor in response to the sensed pressure and temperature.

4,881,376

ADSORPTION REFRIGERATION SYSTEM

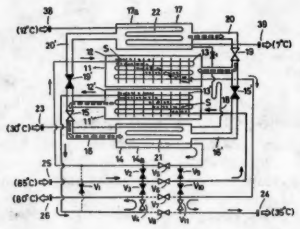
Yasuo Yonezawa, Nara; Masao Matsushita, Hirakata; Kenzo Oku, Kyoto; Hiroki Nakano, Neyagawa; Shin-ichi Okumura, Ootsu; Motoshi Yoshihara, Yawata; Akiyoshi Sakai, Toyonaka, and Atsushi Morikawa, Minoo, all of Japan, assignors to Nishiyodo Air Conditioner Co., Ltd., Osaka, Japan

Filed Feb. 19, 1988, Ser. No. 158,294

Claims priority, application Japan, Aug. 28, 1987, 62-216140; Aug. 28, 1987, 62-131725[U]

Int. Cl.[4] F25B *17/00*

U.S. Cl. 62—106 **15 Claims**



1. In a method of operating an adsorption refrigerant system comprising a plurality of adsorption columns, each of which contains heat transfer tubes and the same solid absorbent; a condenser; an evaporator; and pipelines equipped with valves connecting said adsorption columns with said evaporator and condenser so that a refrigerant may be circulated therethrough, the improvement comprising operating each of said plurality of adsorption columns in such a manner that it alter-

nates between an adsorption stage and a desorption stage and at least two of said adsorption columns are at different stages at the same time; supplying a heat transfer medium to the heat transfer tubes of one of said at least two adsorption columns during its desorption stage and a coolant to the heat transfer tubes of another of said at least two adsorption columns during its adsorption stage; immediately preceding the termination of said desorption stage in said one adsorption column and said adsorption stage in said another adsorption column, transferring the heat transfer medium contained in the heat transfer tubes of said one adsorption column to the heat transfer tubes of said another absorption column to preheat the adsorbent contained therein; and switching said one adsorption column to said adsorption stage and said other adsorption column to said desorption stage.

4,881,377

APPARATUS FOR DIVIDING PARALLELIPIPEDIC BLOCKS OF DEEP FROZEN FOODSTUFFS INTO SMALLER UNITS

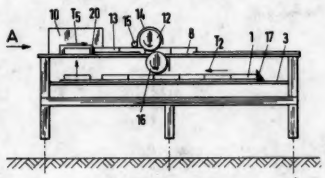
Heinz Nienstedt, Zum Nonnenberg 8 A, D - 4350 Recklinghausen, Fed. Rep. of Germany

Filed Aug. 30, 1988, Ser. No. 238,299

Claims priority, application Fed. Rep. of Germany, Sep. 4, 1987, 3729547; Jun. 28, 1988, 3821712

Int. Cl.[4] F17C *5/02*

U.S. Cl. 62—320 **6 Claims**



1. An apparatus for dividing parallelpipedic blocks of deep frozen foodstuffs into smaller parallelpipedic units, comprising:

a main conveying path,

a first circular saw comprising a plurality of parallel blades mounted on a common drive shaft, said blades being disposed above said main conveying path at a distance from said main conveying path which is smaller than the height of said parallelpipedic blocks;

a second circular saw comprising a second plurality of blades disposed beneath said main conveying path and protruding through said main conveying path, said blades of said second circular saw being aligned with said blades of said first circular saw so as to act as parting means for separating said smaller parallelpipedic units which are not separated by said blades of said first circular saw;

a subsidiary conveying path disposed beneath said main conveying path and running parallel to said main conveying path; and

lifting means for transferring arriving parallelpipedic blocks from said subsidiary conveying path to said main conveying path.

4,881,378

HIGH SPEED ICEMAKER

Jimmy L. Bryant, 4832 Linden St., Columbia, S.C. 29203

Filed May 13, 1988, Ser. No. 193,792

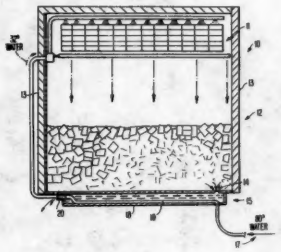
Int. Cl.[4] F25C *1/00*

U.S. Cl. 62—348 **2 Claims**

1. An apparatus, in kit form or for factory installation, for cooling tap water fed to a conventional commercial ice cube maker having an ice cube making section, a storage bin with side walls and a drain for draining residual ice water from the interior of said storage bin, comprising:

a reservoir attached to the underside of said storage bin so as to catch and store residual ice water draining from said storage bin via said drain, and

precooling tubing, carrying said tap water from the tap water source to the ice making section of said commercial ice cube maker, coiled within said reservoir so as to be immersed in said residual ice water therein, and



an overflow tube, attached to said reservoir, for removing excess residual ice water which may accumulate in said reservoir and for carrying said excess water to a sewer or other disposal area, and

holding tubing, for temporarily storing and cooling the precooled tap water, inserted in the flow line from said precooling tubing to said ice making section and coiled in the lower interior section of said storage bin underneath the stored ice cubes therein.

4,881,379

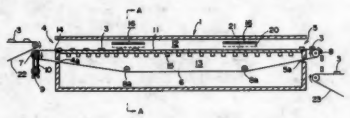
CONTINUOUS QUICK FREEZING APPARATUS FOR FOOD

Tadaaki Sakai, Osaka, Japan, assignor to Nissin Gourmet Beef Co., Ltd., Osaka, Japan

Filed Dec. 23, 1988, Ser. No. 289,192

Int. Cl.[4] F25D *25/04*

U.S. Cl. 62—380 **5 Claims**



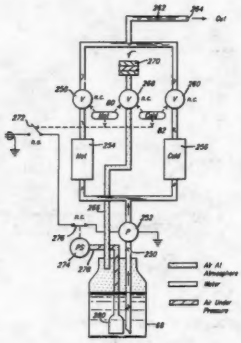
1. A continuous quick freezing apparatus for food comprising a freezing container having a hollow rectangular shape, a cooling plate for separating said freezing container into an upper compartment and a lower compartment, a first cooling means coupled to said cooling plate and located beneath said cooling plate in said lower compartment, a conveying belt disposed movably on said cooling plate for conveying food, a conveying means for driving said conveying belt, an air cooling plate disposed in said upper compartment which is composed of a metal plate and a second cooling means coupled to said metal plate, a support plate for said air cooling plate and a vertical moving device for moving said support plate and air cooling plate vertically within said upper compartment, and openings for food and said conveying belt are provided at both ends of said freezing container.

4,881,380

PLUMBING MODULE FOR BOTTLED WATER COOLER

Ronald J. Mrugala, Rockford; Doyle Raymer, Davis; Dipak J. Negandhi, Freeport, all of Ill., and Robert L. Latzko, Wauwatosa, Wis., assignors to King-Seeley Thermos Co., Freeport, Ill.

Filed Mar. 31, 1988, Ser. No. 176,352
Int. Cl.[4] B67D 5/62
U.S. Cl. 62—389 24 Claims



1. A plumbing module for liquid dispensing systems comprising:

a housing having a front panel;

a pump mounted within said housing;

liquid draw tube coupled to said pump for connection to a source of liquid to be dispensed;

a liquid storage tank coupled to said pump for receiving and storing liquid from said pump;

a refrigeration system for removing heat from said liquid stored in said tank which includes a condenser comprising at least one coolant conducting tube for dissipating heat removed from said liquid stored in said tank;

a dispensing conduit coupled to said tank and valve means disposed on said front panel in communication with said dispensing conduit, said valve means having means for energizing said pump and having means for selectively closing said dispensing conduit; and

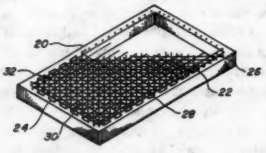
wherein said draw tube is adapted to draw liquid from a sealed bottle and wherein said valve means includes means for selectively venting said bottle to atmosphere.

4,881,381

TEXTILE FABRIC

Irving Townsend, 11910 Mayfield Ave., Los Angeles, Calif. 90049

Filed Dec. 20, 1988, Ser. No. 286,693
Int. Cl.[4] D04B 35/00
U.S. Cl. 66—1 A 7 Claims



1. The method of forming a fabric, a textile fabric using a frame having a plurality of pegs at equally spaced intervals around the perimeter threof which comprise the steps of:

(a) winding yarn a first direction around each of a number of adjacent parallel pegs forming a warp;

(b) winding yarn a second direction 90 degrees from the first around each of the remaining adjacent parallel pegs forming a woof-like layer on top of said warp;

(c) crocheting yarn in a chain stitch a first diagonal direction across the frame around adjacent pegs along two nonadjacent vertices through the woof-like layer and warp layer simultaneously;

(d) crocheting yarn in a chain stitch a second diagonal direction 90 degrees from the first around adjacent pegs along two nonadjacent vertices in the same manner as the first diagonal crocheting; and,

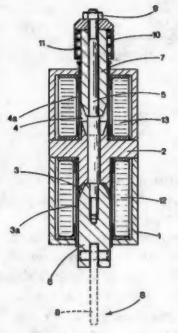
crocheting yarn in a chain stitch through the perimeter of the thus formed textile joining the edge of the wound and crocheted yarn into a substantial sturdy fabric creating tactile depth with a patterned surface.

4,881,382

ELECTROMECHANICAL DEVICE FOR DRAWING ALONG SLIDES SUPPORTING THE SAME NUMBER OF THREAD GUIDES IN AN AUTOMATIC FLAT KNITTING MACHINE

Benito Stoppazzini, Sala Bolognese, Italy, assignor to E.M.M. Emiliana Macchine Maglieria S.R.L., Padulle di Sala Bolognese, Italy

Filed Feb. 24, 1989, Ser. No. 314,939
Claims priority, application Italy, Mar. 1, 1988, 4749/88[U]
Int. Cl.[4] D04B 15/52
U.S. Cl. 66—126 R 2 Claims



1. An electromechanical device for drawing along slides, supporting a same number of thread guides, of an automatic flat knitting machine, with said machine comprising: a carriage that is made to move with an outward and return motion above needle beds of said machine; at least one bar, located parallel to and above said needle beds, with said slides mounted upon and coupled with said bar in such a way that said slides are able to slide along said bar; a plurality of stops removably mounted on said bars, said stops delimiting a stroke os said slides located between two consecutive said stops, with upper surfaces of said stops and slides having a shape designed to form a sliding track, each slide featuring at least two vertical ledges, laterally deliminating a cutout in the upper rib of said slide; and with said device being comprising: a casing including a central body located between two coaxial seats, first and second respectively, with said seats being open to the outside, said casing being fixed to said carriage in such a way as to position the axes of said seats in a vertical plane; two cores, lower and upper respectively, in a ferromagnetic material, which are inserted in such a way that they are able to slide in said first and second seats respectively, said cores being connected to one another by means of a rod inserted into a hole that passes through said

central body, a downward-facing anchor plate being fixed on the outside to said lower core; elastic means acting on said cores and rod, with an upward axial force able to lift said cores when there are no outside forces acting on said cores, consequently positioning said anchor plate in an extreme raised position in which said anchor plate does not strike said tracks of said slides; a first coil located in a an annular chamber surrounding said first seat, designed, as a result of being energised, to exert an upward axial force on said lower core in agreement with the action of said elastic means, very rapidly raising said cores and consequently bringing said anchor plate to said raised position; a second coil, located in an annular chamber surrounding said second seat, designed, as a result of being energised, dependent upon said first coil being de-energised, to exert a downward axial force on said upper core, in opposition to said action of said elastic means, lowering said cores and consequently bringing said anchor plate to an extreme lowered position, in which said anchor plate strikes one of said ledges of a corresponding slide depending upon the direction of movement of said carriage, said downward force, although opposed by said elastic means, being suitable to permit said cores to move with a slight vertical oscillating motion caused by said anchor plate sliding over said tracks.

4,881,383

WARP KNITTED FABRIC WITH SATIN-LIKE BACK AND BRUSHABLE FACE AND METHOD OF KNITTING SAME

Robert T. Spillane, Greensboro; Charles A. Wyrick, Gibsonville; Holger Scheller, and Duval, Paul A., both of Greensboro, all of N.C., assignors to Guilford Mills, Inc., Greensboro, N.C.

Filed Jul. 5, 1988, Ser. No. 215,228

Int. Cl.[4] D04B 7/12

U.S. Cl. 66—194 **17 Claims**

1. A warp knitted fabric of an at least three-bar construction characterized by a brushable surface on the technical face of said fabric and a satin-like surface on the technical back of said fabric, said fabric comprising a set of pile yarns warp knitted in overfed needle loops at the technical face of said fabric forming a brushable pile surface, a set of yarns warp knitted in extended underlaps at the technical back of said fabric forming a satin-like surface effect, and a set of tie-down yarns of substantially smaller denier than said satin yarns and warp knitted at the technical back of said fabric in substantially shorter underlaps than said satin-effect yarns for shielding said satin-effect yarns from picking without significantly obstructing the satin-like appearance of said satin-effect yarns.

4,881,384

HIGH TEMPERATURE DYEING APPARATUS

Mario M. Chicharro, Martorell, Spain, assignor to Montaje Y. Construcciones Del Hierro, S.A., Barcelona, Spain

Filed Jul. 8, 1988, Ser. No. 216,274

Claims priority, application Spain, Apr. 22, 1988, 8801372

Int. Cl.[4] D06B 3/28

U.S. Cl. 68—27 **12 Claims**

1. In a high temperature dyeing apparatus of the type operating in an open chamber on an endless rope of fabric to be dyed, the rope being drawn by mechanical and hydraulic means, the improvement comprising:

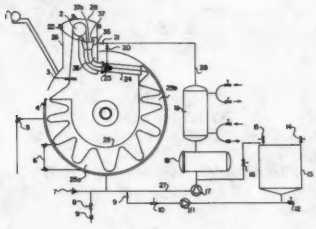
a cylindrical body having curved end walls, a top portion and upper sectors on said top portion;

an even number of open treatment and storage chambers within said cylindrical body;

a cylindrical turret on one of said upper sectors;

means on said turret for opening and closing said turret; and

a drive winch for driving the endless rope of fabric mounted



horizontally in the interior of said turret, said drive winch comprising a cylindrical core, two circular flanges, pairs of rods disposed between said flanges, each rod having an outer side, a cover of non-slip material on said outer side of said rods, and a knurled configuration on said cover material.

4,881,385

APPARATUS FOR PROCESSING TEXTILES

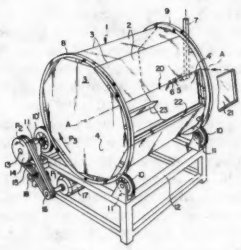
Frank M. P. Lambrechts, 31, Lange Ridderstraat, 2000 Antwerpen, Belgium

Filed Mar. 25, 1988, Ser. No. 173,621

Claims priority, application Netherlands, Mar. 26, 1987, 8700715

Int. Cl.[4] D06F 21/02, 37/04, 37/30

U.S. Cl. 68—29 **5 Claims**



1. A stone-washing machine comprising the combination of a rigid, open base frame having opposite sides, a horizontally disposed drum defining a substantially horizontal axis of rotation, said drum having opposite imperforate end walls of regular polygonal shape defining aligned peripheral edges, a plurality of imperforate substantially rectangular panels each of which extends between an aligned pair of said peripheral edges, said panels engaging one another and said end walls to provide a liquid tight drum, one of said panels having at lest a major section which is selectively removable to define an enlarged opening for loading and unloading the drum with solid stone-like objects and textile objects which are to be stone-washed, means for introducing liquid such as potassium permanganate into the drum, support means on said frame for rotatably supporting said drum about said axis, said support means including a pair of spaced coplanar support wheels supported for rotation at one of said sides of the base frame, drive means for rotating said drum about said axis, and guide means on said drum including a circular track circumscribing one end of the drum and rigidly secured thereto, said circular

track being of generally outwardly directed U-shaped cross section to define a pair of spaced circular leg portions disposed in substantially parallel planes extending perpendicular to said axis, said support wheels being supported for rotation about axes which are substantially parallel with said first-mentioned axis and having a width fitting into said track, said support wheels having opposite lateral surfaces disposed in facing relation to said leg portions of the associated track to provide means for constraining said drum against axial movement along said axis relative to said frame.

4,881,386

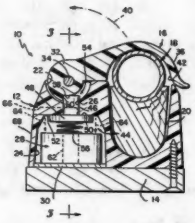
ARTICLE LOCK

James A. Glines, Indianapolis, Ind., assignor to Meyer Plastics, Inc., Indianapolis, Ind.

Filed May 26, 1988, Ser. No. 199,027

Int. Cl.[4] E05B *73/00*

U.S. Cl. 70—19 **19 Claims**



1. An article lock comprising

means for receiving an article,

means for releasably retaining the article in the receiving means, the retaining means being movable relative to the receiving means, and

a single means for blocking movement of the retaining means relative to the receiving means to fix the retaining means in a predetermined position locking the article in the receiving means, the blocking means being movable by an actuating means between a projected position engaging the retaining means and a retracted position away from the retaining means, the receiving means being formed to include means for introducing a key to the blocking means so that the key is movable in the introducing means to cause a key bit on the key to engage and act on the blocking means independent of the actuating means to move the blocking means to its retracted position, thereby permitting movement of the retaining means relative to the receiving means to release the article.

4,881,387

SHACKLE LOCK

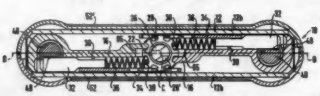
Ludger Kortenbrede, Telgte, Fed. Rep. of Germany, assignor to Aug. Winkhaus GmbH & Co. KB, Telgte, Fed. Rep. of Germany

Filed Apr. 28, 1989, Ser. No. 345,417

Claims priority, application Fed. Rep. of Germany, May 6, 1988, 3815584

Int. Cl.[4] E05B *67/22*

U.S. Cl. 70—39 **18 Claims**



1. A shackle lock, especially with a long shackle, comprising a lock body (10) and a locking shackle, the end portions (4) of the shackle arms being adapted to fit into respective shackle arm housings (42) until a locked position is reached (FIG. 1), and being completely seaparable from the lock body (10) by withdrawal of the arm end portions (40) from the housings (42) (FIG. 8), at least one lock bolt (32) being furthermore guided for movement in the lock body (10) and being pretensioned by biassing means (36) in the direction of an engaged position (FIGS. 1 and 2), so that after the arm end portions (40) have been pushed into their locked position inside the arm housings (42), they move into the engaged position (FIGS. 1 and 2), engaging thereby into a bolt engagement surface (48) of at least one arm end portion (40), so preventing withdrawal of this arm end portion (40) from the associated arm housing (42), there being furthermore provided inside the lock body (10) a key-operated bolt withdrawal mechanism (20) which is connected by a gearing (28, 34) to the lock bolt (32) and which can by means of the key be moved against the action of the biassing means (36) from a basic state (FIGS. 1 and 2) corresponding to the engaged position of the lock bolt (32) and in which the key can be inserted and withdrawn, into a lock-opening state (FIG. 9) which necessarily produces a disengaged position of the lock bolt (32), characterised in that there is in the shackle arm housing (42) a bolt control member (46), which, subject to spring pressure (44), bears on the arm end portion (40), so that when the lock bolt (32) is moved out of the engaged position (FIGS. 1 and 2) and into the disengaged position (FIGS. 8 and 9), it causes a displacement of the arm end portion (40) out of the locked position and into the direction of separation from the lock body (10) (FIGS. 8 and 9) and thereby out of a bolt release position (FIGS. 1 and 2) into a bolt influencing position (FIGS. 8 and 9) in which it prevents the return of the lock bolt (32) to its bolt engaged position (FIGS. 1 and 2) (FIGS. 8 and 9).

4,881,388

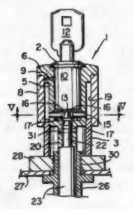
LOCK FOR A BRAKE VALVE

Ronald Pruim, 29 Lynn Ridge Villas S.E., Calgary, Alberta, Canada (T2C 2N1)

Filed Oct. 28, 1988, Ser. No. 264,138

Int. Cl.[4] F16K *35/00*

U.S. Cl. 70—175 **13 Claims**



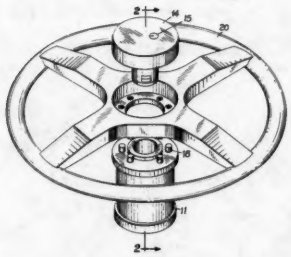
1. A lock device for a plunger operated valve comprising tubular casing means; coupler means on one end of said casing means for engaging the plunger of a valve so that the plunger can be operated by movement of said casing means only; sleeve means slidable in said one end of said casing means for movement into said casing means permitting plunger operation and actuation of the valve, and out of said casing means against a fixed element carrying said valve plunger; pin means radially slidable in said casing means for enaging said sleeve means to prevent movement thereof into said casing means, and consequently to prevent actuation of the valve; and lock means for controlling movement of said pin means, and thereby control actuation of said valve means.

4,881,389

ANTI-THEFT DEVICE FOR AUTOMOBILE VEHICLES

José Alfon; Alberto Martínez, and Abelardo Martínez, all of Final Ave. La Industria, Galpón No. 2, Urb. Industrial Palo Verde - Petare, Caracas, Venezuela

Filed Dec. 1, 1987, Ser. No. 126,661
Int. Cl.[4] E05B *13/10*
U.S. Cl. 70—209 2 Claims



1. An anti-theft device for preventing unauthorized use or theft of vehicles by rendering the steering mechanism unserviceable, comprising:

a. a hollow fastening cylinder secured firmly to the steering column;

b. a steering wheel with a cylindrical opening in the upper side of the central part, said opening having a central hole; and

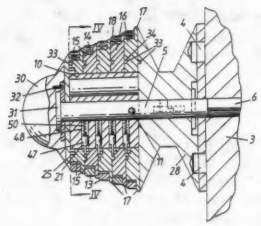
c. a lock casing removably mounted with its upper flanged part in the cylindrical opening of the steering wheel, and its lower cylindrical part in the hollow part of the fastening cylinder, axially and radially secured as well to the steering wheel as to the fastening cylinder, wherein said steering wheel, said fastening cylinder and said lock casing are mutually secured radially by means of studs placed on top of the fastening cylinder entering through suitable holes in the steering wheel into convenient holes in said lock casing.

4,881,390

COMBINATION LOCK

Michael Vale, 3 Beech Avenue, Beech Barn, Sanderstead, Surrey CR2 ONN, England

Filed Jun. 30, 1988, Ser. No. 213,386
Claims priority, application United Kingdom, Jul. 2, 1987, 8715607; Mar. 7, 1988, 8805377
Int. Cl.[4] E05B *37/02*
U.S. Cl. 70—219 17 Claims



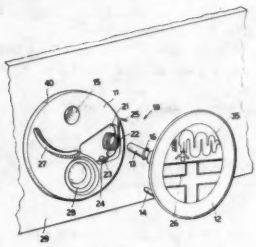
1. A combination lock comprising a shaft, a plurality of discs mounted coaxially on the shaft for individual rotation thereon, each disc having a first internal annular surface formed with a depression, the depression of at least one disc defining an abutment edge, a latch member mounted between the shaft and the annular surfaces and extending parallel to the shaft, biasing means urging the latch member into engagement with the first annular surfaces, the discs being rotatable on the shaft without turning the shaft, except when all the depressions are aligned with the latch member, so that with the latch member in its latched position extending into the depressions rotating in one direction of the disc or discs having an abutment surface causes the abutment surface or surfaces to engage the latch member and turn the shaft.

4,881,391

MOVABLE COVER DEVICE FOR AN AUTOMOBILE LOCK

Ezio Villa, Arese, and Giuseppe Biazzi, Uboldo, both of Italy, assignors to Alfa Lancia Industriale S.p.A., Arese, Italy

Filed Jun. 27, 1988, Ser. No. 211,560
Claims priority, application Italy, Jul. 16, 1987, 22026/87[U]
Int. Cl.[4] E05B *17/18*
U.S. Cl. 70—455 1 Claim



1. A movable cover device for an automobile lock, said device comprising a plate supporting a lock operating actuator, means for fixing said plate to a wall of a compartment of an automobile, and a cover being pivotably mounted on said plate, said cover having an area substantially equal to that of said plate, said cover having a wall and a pivot positioned substantially orthogonal to said cover wall, said plate having a wall and a bush for rotatably supporting said pivot, said bush being rigid with said plate wall and positioned substantially orthogonal to said plate wall, said plate wall and said cover wall being in contact when said cover and said plate are completely superposed, a load-reversing wire spring being positioned between said plate and said cover, and said load-reversing wire spring having a pair of ends, one of said spring ends being pivotably mounted in said plate and the other of said spring ends being pivotably mounted in said cover, said track having a profiled base formed from a depressed step close to its closure end and being situated at a depth equal to the length of said peg, a connection ramp, and a raised runway being situated at a depth less than the length of said peg.

4,881,392

HOT LEVELLER AUTOMATION SYSTEM

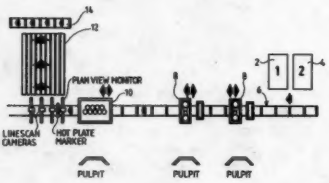
Noel E. Thompson, Mangerton; Richard Martin Johns, Balgownie; Gregory Rozmus, Figtree; George F. Voss, Bar Beach; William J. Edwards, Carey Bay, and Peter J. Thomas, Adamstown, all of Australia, assignors to Broken Hill Proprietary Company Limited, Victoria and Industrial Automation Services Pty Ltd., New South Wales, both of, Australia

Filed Apr. 13, 1988, Ser. No. 180,911
Claims priority, application Australia, Apr. 13, 1987, PI1404/87
Int. Cl.[4] B21D *1/02*
U.S. Cl. 72—7 30 Claims

1. A method of controlling a hot leveller for metal plates, said hot leveller having upper and lower work rolls mounted in

upper and lower cartridges, a drive means for driving the work rolls, an adjustment means for controlling relative positions of the upper and lower work rolls, and a control means for controlling the drive means and adjustment means, said method including the steps of:

inputting data to the control means relating to (i) type of levelling required, (ii) type of material of the plates, and (iii) temperature and thickness of the plates;



determining the number of passes of the plates through the hot leveller to achieve the levelling required based on the data input to the control means;

determining setting values for controlling the drive means and adjustment means based upon leveller deflection and plate deflection;

applying the setting values to the drive means and adjust means; and

passing a plate between the upper and lower work rolls for said number of passes to level the plate.

4,881,393

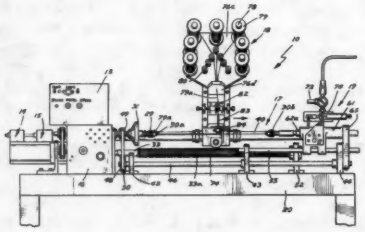
WIRE COILING APPARATUS

Willard D. Sykes, 921 SW. 15th St., Forest Lake, Minn. 55025

Filed Aug. 26, 1988, Ser. No. 240,069

Int. Cl.[4] B21F *3/04, 35/00*

U.S. Cl. 72—27 **6 Claims**



1. A wire coiling apparatus, having in combination

an arbor,

first and second belts directly and respectively engaging opposite ends of said arbor for rotating said arbor,

a first servo motor driving said first and second belts,

a lead screw parallel to said arbor,

third and fourth belts directly and respectively engaging opposite ends of said lead screw for rotating said lead screw,

a second servo motor driving said third and fourth belts,

a programmed computer in operatively connected to said first and second servo motors for driving said motors at the same or relative speeds,

an upstanding frame having a face for mounting a spool of coiling wire thereon,

means mounted on said frame for feeding wire or a plurality of wires to said arbor, and

said computer causing said servo motors within the continuous operation of coiling said wire or wires upon said arbor to produce variations in pitch and spacing thereof at programmed intervals in the process of a continuous coiling operation.

4,881,394

METHOD AND APPARATUS FOR IRONING THE WALL OF A ONE-PIECE CYLINDRICAL BODY

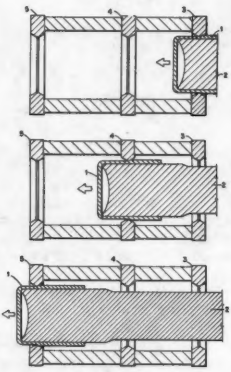
Egbert Jansen, Purmerend, Netherlands, assignor to Hoogovens Groep B.V., Ijmuiden, Netherlands

Filed Jul. 6, 1988, Ser. No. 215,562

Claims priority, application Netherlands, Jul. 10, 1987, 8701623

Int. Cl.[4] B21D *22/20*

U.S. Cl. 72—45 **17 Claims**



1. Wall ironing apparatus for ironing the wall of a deep-drawn cylindrical body having a ram and at least one ring die structure for reducing the wall thickness of the body forced through the die structure by the ram, wherein said die structure has successive first and second ring die regions arranged for simultaneously performing a wall thickness reduction in two phases, the first die region having an internal diameter slightly larger than that of said second die region and the die dimensions being such that the first die region performs a relatively small reduction while the second die region performs a relatively large reduction, said die structure being constructed to provide a fluid-tight sealed annular space which in use is bounded by die structure and the portion of the body between contact regions of the body with the first and second die regions, there being at least one inlet for introducing lubricant to said annular space, and said die structure including an elongate face of internal diameter slightly greater than that of the second die region and bounding said annular space at a region between the lubricant inlet and the second die region to provide a narrow region of said annular space along which in use lubricant is entrained towards the second die region by the moving body being ironed.

4,881,395

PROCESS AND APPARATUS FOR FABRICATING STEPPED NAILS

Katsumi Shinjo, Osaka, Japan, assignor to Yugen Kaisha Shinjo Seisakusho; Teruyuki Matsui; Kikuma Matsuyama and Toshisaida Saito, all of Osaka, Japan

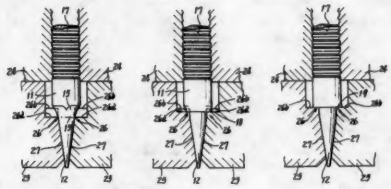
Filed Jun. 21, 1988, Ser. No. 209,380

Int. Cl.[4] B21H *3/06, 3/30*

U.S. Cl. 72—90 **4 Claims**

1. A process for fabricating stepped nails, the process comprising the steps of pressing an end portion of a blank by a first die means for shaping the same into a rough slender tip portion having a smaller diameter than a diameter of a shank portion of

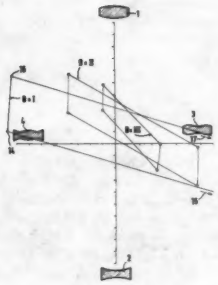
the blank, pressing the shank portion of the blank by a thread rolling die means of a second die means for cutting threads on a peripheral surface of the shank portion to prevent the blank from coming out of the first die means, providing a correction die means having a shoulder with a rising portion and a curved surface complimentary with an outer profile of the slender tip

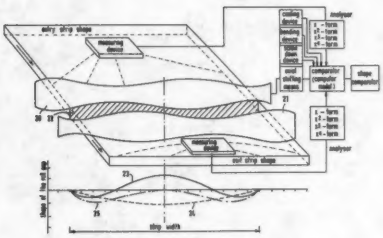


portion, and squeezing a round shoulder formed between the shank portion and the slender tip portion by the rising portion of the shoulder of the correction die means so as to cause squeezed metal to protrude radially until it has a diameter of the shank portion, thereby forming a shoulder perpendicular to an axis of the shank portion.

pendence upon the radius r from the respective axial position x to the equation

$$r(x)=a+bx+cx^2+dx^3+ex^4+fx^5$$





wherein the contours are determined by inserting given preferred fixed values into this equation.

4,881,396

ROLLING MILL STAND WITH AXIALLY SLIDABLE ROLLS

Jürgen Seidel, Kreuztal-Ferndorf; Dieter Rosenthal, Niederfischbach, and Jürgen Klöckner, Netphen-Eschenbach, all of Fed. Rep. of Germany, assignors to SMS Schloemann-Siemag Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Apr. 11, 1988, Ser. No. 180,141

Claims priority, application Fed. Rep. of Germany, Apr. 9, 1987, 3712043

Int. Cl.[4] B21B *31/18, 37/00, 31/20*

U.S. Cl. 72—247 **7 Claims**

1. In a rolling mill stand with work rolls which are supported by back-up rolls or by intermediate and back-up rolls, wherein the work rolls, the intermediate rolls and the back-up rolls are axially slidable relative to each other into and out of a neutral position, the rolls having bodies with circumferential lines, the bodies being provided with alternatingly concavely and convexly shaped contours, such that the rolls supplement each other in at least one axial position of the rolls so that no gap exists between the rolls, wherein corrections of the roll gap between a pair of rolls are carried out by relative axial displacement of the rolls, the improvement comprising the contours of each of the rolls having in the neutral roll position thereof, in addition to a possible maximum in the middle, maximum inclinations of the circumferential lines on both sides of the middle of the circumferential surfaces of the rolls in longitudinal direction of the rolls in which roll gap profile changes are to be effected, wherein the contours of the rolls correspond in de-

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4,881,397

AIR CONVEYOR FOR REMOVING PARTS FROM A HIGH SPEED FORMING PRESS

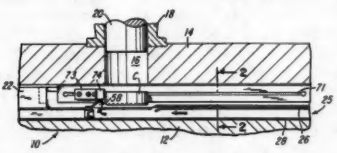
Harry D. Stewart, Tipp City, and Ralph P. Stodd, Dayton, both of Ohio, assignors to Formatec Tooling Systems, Inc., Dayton, Ohio

Continuation of Ser. No. 12,500, Feb. 9, 1987, Pat. No. 4,741,196. This application May 2, 1988, Ser. No. 189,319

The portion of the term of this patent subsequent to May 3, 2005, has been disclaimed.

Int. Cl.[4] B21D *45/02;* **B21J** *13/08*

U.S. Cl. 72—361 **13 Claims**



12. A method of rapidly and dependably transferring a succession of metal articles through a tunnel defined between the bed of a mechanical press and the lower die shoe of an article forming die set mounted on the press bed, comprising the steps of positioning within the tunnel on the press bed an elongated air conveyor including parallel spaced walls and defining therebetween an air receiving chamber with the conveyor

having an inner end portion and an outer end portion, blowing air into the chamber from a motor driven blower connected to the outer end portion, directing a flow of air from the inner end portion of the chamber through an air outlet adjacent an article receiving zone on one of the walls of the conveyor and then longitudinally above the one wall for quickly moving each article from the article receiving zone towards the outer end portion of the conveyor, and directing an additional flow of air from the air chamber through an opening spaced longitudinally from the air outlet for continuing the transfer of each article to the discharge end of the conveyor.

4,881,398

TRANSFER PRESS

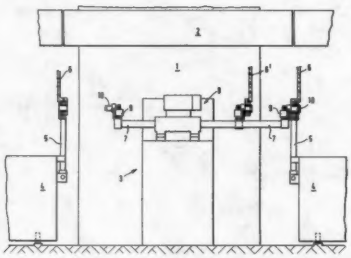
Edmund Daubner, Goeppingen-Bartenbach, and Gerald Mikusch, Goeppingen, both of Fed. Rep. of Germany, assignors to L. Schuler GmbH, Geoppingen, Fed. Rep. of Germany

Filed Mar. 23, 1988, Ser. No. 172,311

Claims priority, application Fed. Rep. of Germany, Mar. 25, 1987, 3709762

Int. Cl.[4] B21D *43/20*

U.S. Cl. 72—419 **6 Claims**



1. An arrangement for the intermediate deposit of workpieces in inoperative idling stage areas of transfer presses remote from active work stage areas of transfer presses, comprising gripping and holding devices arranged in the idling stage areas for template means moved into tool spaces of the transfer press with sliding table means movable between the idling stage areas and the work stage areas of transfer presses by way of retaining means, template carrier means arranged at the gripping and holding devices which are displaceable generally horizontally toward the sliding table means and away from the same by a motorized drive means associated with the template carrier means, rotatable mounting bolt means provided at the template carrier means and rotatable by way of an adjusting means, said rotatable bolt means cooperating with apertures in the template means in the manner of a bayonet connection, the template means being provided with rotatably supported mounting bushing means, into which the mounting bolt means are adapted to be inserted, the retaining means being bored out for receiving the mounting bushing means, a first bayonet-like connection means being provided between the mounting bushing means and the mounting bolt means, a second bayonet-like connection means being provided between the retaining means and the mounting bushing means, the bayonet-like connection means being operable to be activated one after the other in such a manner that the bayonet-like connection means between the mounting bushing means and the mounting bolt means becomes effective in time prior to the bayonet-like connection means between the retaining means and the mounting bushing means when the mounting bolt means has been guided into the mounting bushing means for taking over the template means.

4,881,399

DOUBLE-ACTION SCREW PRESS

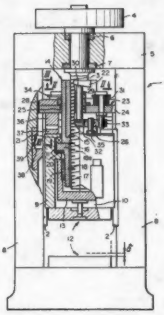
Jury A. Bocharov; Anatoly V. Safonov; Anatoly P. Nosov; Jury I. Tamaris, all of Moscow; Evgeny S. Lunkov, Chimkent; Vladimir I. Myakinenkov, Chimkent; Igor Y. Perepechin, Chimkent; Leonid L. Rudman, Kiev; Viktor P. Salov, Voronezh; Igor V. Bovykin, Voronezh, and Mark M. Zaidlin, Voronezh, all of U.S.S.R., assignors to Moskovskoe Vyschee tekhnicheskoe uchilische imeni N.E.Baumana, Moscow and Experimentalny nauchno-issledovatelsky institut kuznechno-pressovogo mashinostroenia "ENIKMASH", Voronezh., both of, U.S.S.R.

PCT No. PCT/SU86/00054, § 371 Date Jan. 28, 1988, § 102(e) Date Jan. 28, 1988, PCT Pub. No. WO87/07210, PCT Pub. Date Dec. 3, 1987

PCT Filed May 29, 1986, Ser. No. 174,519

Int. Cl.[4] B21D *22/00;* B21J *9/10*

U.S. Cl. 72—454 **4 Claims**



1. A double-action screw press comprising:

a frame for receiving a load and including upper and lower traverses interconnected by two vertical uprights, the lower traverse of said frame secured to a foundation, the two vertical uprights spaced apart from each other and securely fastened on said lower traverse, the upper traverse of said frame mounted on said two vertical uprights;

a first plurality of guideways, at least one of said guideways disposed on each of said two vertical uprights along a longitudinally extending axis of said frame;

a first screw rotatably mounted with respect to the axis of said frame and fastened in said upper traverse;

an outer slide positioned concentrically with said first screw, guided by said first plurality of guideways and having two coaxially arranged, intercommunicated spaces formed therein;

a press tool received within one of said intercommunicated spaces;

a second plurality of guideways provided on an inner surface of said outer slide and located in said one of said interconnected spaces;

an inner slide mounted on said second plurality of guideways and having a space formed therein arranged coaxially to said first screw;

a first nut in engagement with said first screw and arranged concentrically with the axis of said first screw;

a second nut placed in the space formed in said inner slide and rigidly mounted on an inner side surface of said inner slide;

a hollow screw, embracing said first screw, in engagement with said second nut, said hollow screw rigidly connected with a nut body of said first nut, said nut body forming a carrying member;

at least two first stops arranged symmetrically to the axis of said first screw and mounted on the outer surface of said carrying member, each of said first stops including a sup-

porting surface having an angle of inclination opposite to the inclination of helical threads of said first screw; and

a braking mechanism for braking said outer slide, when it approaches an extreme bottom position, comprising:

(1) a plate for braking the outer slide, arranged perpendicularly to the axis of said first screw, movable along the axis of said first screw and having a through hole arranged concentrically with said first screw, said plate embracing said carrying member;

(2) elastic elements located on a surface of said plate facing said at least two first stops;

(3) traverses installed between said plate and an upper face surface of said outer slide and kinematically coupled with a pair of said elastic elements;

(4) screws, a pair of which is connected with each of said traverses by first threaded ends, second ends of said pair of screws including heads thereon resting on the upper face surface of said outer slide;

(5) second stops, each of which is moupted for rotation relative to the axis thereof in said plate and interacts with one of said traverses at one end thereof and with one of said at least two first stops by means of an inclined face surface at the opposite end thereof, the inclined face surface having an angle of inclination coinciding with the angle of inclination of the support surface of said at least two first stops; and

(6) two stops for limiting movement of said plate for braking the outer slide, each being rigidly coupled with one of said two vertical uprights and having sloping and horizontal thrust faces interacting with said plate to limit movement of said plate when said outer slide approaches its extreme bottom position.

4,881,400

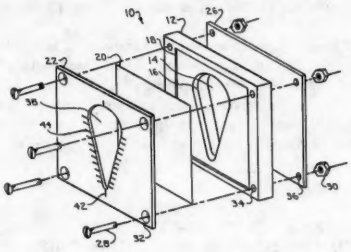
CONTINUOUS MEASURING DIAPHRAGM PRESSURE GAGE

Henry J. Goodman, Baltimore; Evan H. Walker, Aberdeen, both of Md., and Emmett L. Bell, Glennville, Ga., assignors to The United States of America as represented by the Secretary of The Army, Washington, D.C.

Filed Sep. 22, 1988, Ser. No. 248,761

Int. Cl.[4] G01N *33/22*; F16K *17/40*

U.S. Cl. 73—35 **4 Claims**



1. A mechanical pressure gage for measuring the peak pressure of a pressure range of a fluid comprising:

a housing including:

a first plate member having a wedge-shaped opening centrally located and extending therethrough;

a second plate member having front and back sides;

said front side having a recess;

diaphragm means being frictionally positioned in said recess and being deformed in a mechanical and ruptured manner by a peak pressure that exceeds a threshold pressure sufficient to rupture said diaphragm means;

a third plate member forming a back support for said second plate member;

said first, second, and third plate members being fixedly attached on their respective outer edges; and

scale marking means located adjacent to the edge of said wedge-shaped opening for measuring said peak fluid pressure.

4,881,401

KNOCK DETECTION SYSTEM

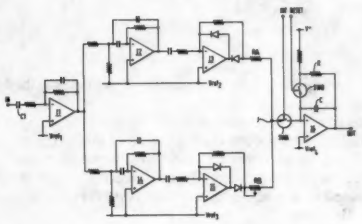
Kevin Cockerham, Sutton Coldfield, England, assignor to Lucas Industries public limited company, Birmingham, United Kingdom

Filed Mar. 2, 1988, Ser. No. 162,972

Claims priority, application United Kingdom, Mar. 4, 1987, 8705023

Int. Cl.[4] G01L *23/22*

U.S. Cl. 73—35 **4 Claims**



1. A knock detection system for an internal combustion engine having a vibration sensing transducer, said knock detection system comprising:

an input for receiving a signal from said vibration sensing transducer, which signal includes a knock component;

first and second bandpass filter means connected to said input, each bandpass filter means having an output, said first bandpass filter means being arranged to pass said knock component of the received signal and said second bandpass filter means having a pass band adjacent that of said first bandpass filter means for substantially blocking said knock component;

means for comparing the output of said first bandpass filter means with the output of said second bandpass filter means so as to provide a knock-representing signal, said comparing means comprises rectifying means connected to the outputs of said bandpass filter means; and means for forming said knock-representing signal as the difference between said rectified outputs of said first and second bandpass filter means, said rectifying means including means for rectifying opposite polarities of outputs from said first and second bandpass filter means and said means for forming said knock-representing signal comprises a summing means; and

integrating means for integrating said knock-representing signal for a predetermined period.

4,881,402

PROCESS FOR THE DETERMINATION OF LIQUID ABSORPTION OF POWDERY SOLIDS

Jurgen Markert, Dulmen; Klaus-Dieter Schubel, Datteln, and Milan Krizek, Marl, all of Fed. Rep. of Germany, assignors to Huels Aktiengsellschaft, Marl, Fed. Rep. of Germany

Filed Aug. 19, 1988, Ser. No. 233,743

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1987, 3727794

Int. Cl.[4] G01N *13/00*

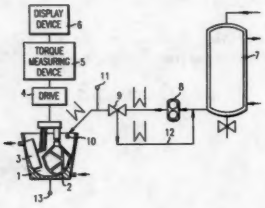
U.S. Cl. 73—61 R **4 Claims**

1. A process for measuring the liquid absorption capacity of a powder, comprising the steps of:

stirring the powder in a mixing chamber of a planetary

mixer, the mixing chamber being between 10% and 80% filled with the powder;

spraying a liquid in the form of a spray cone, and at a throughput which is constant over time, onto the powder from at least one spraying device, said liquid being heated to have a viscosity of 0.1 to 50 mPa·s at shear rates of 5×10^3/sec. to 5×10^6/sec., said constant throughput having such a value that a liquid mass of 0.05 to 6 times the mass of the powder is sprayed in 0.1 to 10 minutes;



measuring a torque of a stirrer of said mixer before and during said spraying step;

determining a maximum level of said torque and a time difference between the beginning of said spraying step and a time when said maximum level is reached; and

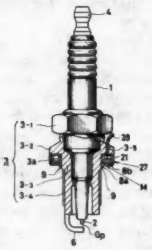
determining an amount of liquid absorption of the powder based on the liquid mass which is sprayed during said time difference.

4,881,403

SPARK PLUG WITH PRESSURE SENSOR

Junichi Kagawa; Yoshiaki Saiki, and Kozo Amano, all of Nagoya, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Aug. 19, 1988, Ser. No. 234,214
Claims priority, application Japan, Aug. 25, 1987, 62-209313
Int. Cl.[4] G01L *9/08*
U.S. Cl. 73—115 **7 Claims**



1. A spark plug with pressure sensor comprising;

a center electrode having a high voltage terminal;

an insulator provided around said center electrode to securely support it;

a tubular metallic shell provided to support said insulator at its inner side;

a pressure sensor having a piezoelectrical element at least enclosed by a casing of metallic hollow ring;

said metallic shell having a diameter-increased portion and a diameter-reduced portion;

said casing of said sensor being inserted into said diameter-reduced portion with an inner side of said casing tightly engaging said outer side of said diameter-reduced portion;

a mount means having a ring portion and a flange portion said ring portion tightly inserted into said diameter-reduced portion while said flange portion tightly sandwiching said casing with a step between said diameter-increased portion; and

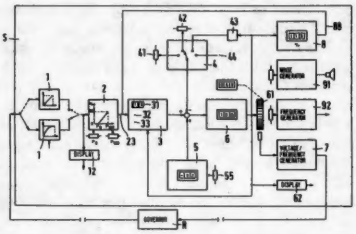
said ring portion being welded to said diameter-reduced portion to maintain air-tight relationship between an inner side of said ring portion and an outer side of said diameter-reduced portion.

4,881,404

DIESEL ENGINE SIMULATOR AND A METHOD OF ADJUSTING THE DYNAMIC RUNNING CHARACTERISTICS OF A DIESEL ENGINE

Walter Siegl, Zurich, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Mar. 9, 1988, Ser. No. 165,830
Claims priority, application Switzerland, Mar. 19, 1987, 1038/87
Int. Cl.[4] G01M *15/00*
U.S. Cl. 73—119 A **19 Claims**



1. A diesel engine simulator comprising

at least one input stage for receiving an input signal from an electronic speed governor and emitting a corresponding voltage signal;

an injection pump simulation block for simulating an injection pump setting, said simulation block being connected to said input stage to receive said voltage signal and emit a corresponding torque signal;

a diesel engine simulator circuit connected to said simulation block to emit a speed signal corresponding to said torque signal;

at least one adjustable torque-load simulation block for superimposing a signal therefrom on said speed signal of said diesel engine simulator circuit; and

a convertor for converting a resultant simulated speed signal from said diesel engine simulator circuit to a frequency signal for output to the electronic speed governor.

4,881,405

METHOD AND DEVICE FOR MECHANICAL TESTING OF CIVIL ENGINEERING STRUCTURE SURFACINGS

Jean Paquet, Plaisir, France, assignor to Centre Experimental De Recherche et D'Etudes Du Batiment, France

Filed Jan. 19, 1988, Ser. No. 145,147
Claims priority, application France, May 21, 1986, 86 07234
Int. Cl.[4] G01M *19/00*
U.S. Cl. 73—146 **18 Claims**

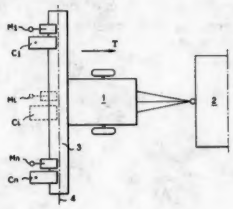
6. Device for mechanical testing of civil engineering structure surfacings, characterised in that it comprises:

a mobile support (3) adapted to be moved (T) across the surface of the surfacing,

percussion means (Mi) disposed on the support (3), said means (Mi) serving to generate sequential calibrated test impacts on said surface of the surfacing,

sensor means (Ci) fastened to the mobile support, said sensor

means being mechanically decoupled from the support (3), said sensor means (Ci) serving to deliver an electrical



signal representative of the impulse response of the surfacing to the calibrated test impacts.

4,881,406

APPARATUS AND METHOD FOR TAKING MEASUREMENTS WHILE DRILLING

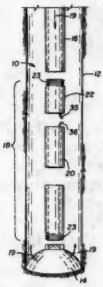
Glenn E. Coury, P. O. Box 666, Wheat Ridge, Colo. 80034

Continuation-in-part of Ser. No. 25,192, Mar. 12, 1987, Pat. No. 4,765,183. This application Aug. 22, 1988, Ser. No. 235,112

The portion of the term of this patent subsequent to Aug. 23, 2005, has been disclaimed.

Int. Cl.[4] E21B *47/06*

U.S. Cl. 73—154 **20 Claims**



1. An apparatus for taking measurements while drilling an earth formation at the wall of a well bore and calculating therefrom by the laws of multidimensional and transient heat transfer by conduction a desired reservoir property, comprising:

a temperature sensing means for measuring the temperature of the face of a well bore;

a support means for carrying said temperature sensing means at a preselected depth in the well bore, substantially at the position of the earth formation to be measured;

a locating means for positioning said temperature sensing means laterally of the support means at a proper position with respect to the bore wall for taking a temperature measurement of the face of the bore wall;

an activating means for causing the temperature sensing means to register temperature readings of the face of the well bore over a predetermined period of elapsed time;

a processing means for receiving the temperature readings of the well bore face from said temperature sensing means and calculating therefrom by the laws of multidimensional and transient heat transfer by conduction said desired reservoir property; and means for transmitting the readings of the temperature sensing means to said processing means.

4,881,407

HOT WIRE AIR FLOW METER

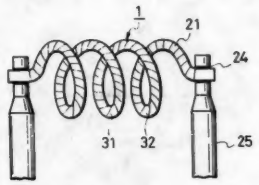
Minoru Tashahashi, Mito; Hiroastu Tokuda, Katsuta; Izumi Watanabe, Katsuta, and Yutaka Nishimura, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Automotive Engineering Co., Ltd., Katsuda, both of, Japan

Filed Oct. 8, 1987, Ser. No. 105,809

Claims priority, application Japan, Oct. 8, 1986, 61-239940; Oct. 8, 1986, 61-239941

Int. Cl.[4] G01F *1/68*

U.S. Cl. 73—204.16 **5 Claims**



1. For use in a hot wire air flow meter, to be arranged at an air passage for measuring an intake mass air flow for an electronic control fuel injection apparatus, having a heating resistor and a driving circuit for controlling current flowing through the heating resistor to produce an output voltage of said heating resistor as a signal corresponding to the mass air flow, said heating resistor comprising a platinum film deposited on a bobbin made of zirconia or glass fiber, said platinum film providing a predetermined resistance value, wherein said bobbin has the shape of a coil.

4,881,408

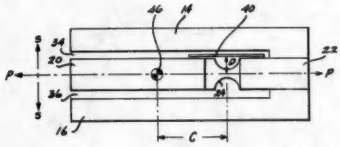
LOW PROFILE ACCELEROMETER

Rand H. Hulsing, II, Redmond; Rex B. Peters, Woodinville, and Brian L. Norling, Mill Creek, all of Wash., assignors to Sundstrand Data Control, Inc., Redmond, Wash.

Continuation of Ser. No. 28,591, Mar. 20, 1987, abandoned. This application Feb. 16, 1989, Ser. No. 313,289

Int. Cl.[4] G01P *15/10*

U.S. Cl. 73—517 AV **7 Claims**



1. An accelerometer for measuring acceleration along a sensitive axis, the accelerometer comprising:

a support;

a proof mass, the proof mass and the support having a coefficient of thermal expansion different from the coefficient of thermal expansion of crystalline quartz;

mounting means for mounting the proof mass to the support such that the proof mass has a rotational degree of freedom about a hinge axis perpendicular to the sensitive axis;

force sensing means comprising one or more force sensing elements, each force sensing element comprising a vibrating beam transducer having a beam consisting essentially of crystalline quartz, each force sensing element being connected between the proof mass and the support, each force sensing element being positioned along a line that is parallel to a pendulous axis defined as an axis normal to the hinge axis and passing through the hinge axis and the

center of mass of the proof mass, the force sensing means being symmetrically positioned with respect to a plane that is normal to the hinge axis and that passes through the center of mass of the proof mass, all force sensing elements being connected between the proof mass and support such that rotation of the proof mass in a given direction about the hinge axis puts all force sensing elements in tension or all forces sensing elements in compression, the force sensing means and the mounting means being the only constraints on rotation of the proof mass about the hinge axis; and

the perpendicular distance between the hinge axis and each line being less than the distance between the hinge axis and the center of mass of the proof mass.

4,881,409

MULTI-POINT WALL THICKNESS GAGE

David H. Roarty, Murrysville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 13, 1988, Ser. No. 205,891
Int. Cl.[4] G01N *29/00*
U.S. Cl. 73—597 **19 Claims**

1. An apparatus for simultaneously measuring the thickness of a ferro-magnetic material at a plurality of discrete points, the measuring apparatus comprising:

a magnetic pad securable to said ferro-magnetic material at a predetermined location;

a plurality of individual ultrasonic transducers associated with the magnetic pad so as to form a grid pattern for measuring the thickness of the material at each of said discrete points;

means for transmitting an ultrasonic pulse through each of said transducers and into the ferro-magnetic material; and

means for receiving a plurality of return signals from the ferro-magnetic material, one signal through each of said transducers, said return signals being indicative of the thickness of the material at each of said discrete points.

4,881,410

ULTRAMINIATURE PRESSURE SENSOR AND METHOD OF MAKING SAME

Kensall D. Wise, and Hin-Leung Chau, both of Ann Arbor, Mich., assignors to The Regents of the University of Michigan, Ann Arbor, Mich.

Division of Ser. No. 57,884, Jun. 1, 1987, Pat. No. 4,815,472. This application May 4, 1988, Ser. No. 190,310
Int. Cl.[4] G01L *7/08, 9/12*
U.S. Cl. 73—724 **24 Claims**

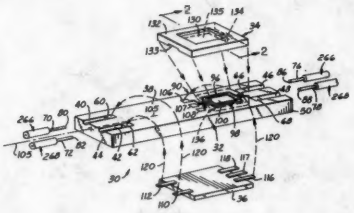
17. A transducer including a pressure-adjustable parallel plate capacitor, comprising:

a first electrically conductive plate; and

an integrally formed structure made from single-crystal silicon semiconductor material and having a diaphragm and a rim that extend entirely around the periphery of the diaphragm and mechanically supports the diaphragm in a nominal position parallel to and at a predetermined nominal distance from the first plate,

the diaphragm and rim being electrically conductive and heavily impregnated with at least a first material which alters an etching characteristic thereof in comparison to single-crystal material which is identical to the heavily impregnated material of the diaphragm and rim except for containing substantially less of such first material,

the diaphragm constituting a second electrically conductive plate, and



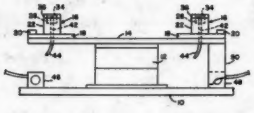
being sufficiently thin relative to its overall size to allow it to respond to a mechanical force applied which is thereto in the form of changing pressure in a range designed to be measured by said transducer, thereby changing the capacitance of the parallel place capacitor.

4,881,411

SPECIMEN HOLDER AND ROTARY ASSEMBLY

Daron C. Holderfield, Boaz; Bernard E. Martin, Huntsville, both of Ala., and Samuel S. Russell, Irmo, S.C., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 27, 1988, Ser. No. 263,305
Int. Cl.[4] G01N *3/04*
U.S. Cl. 73—856 **14 Claims**



1. A mount for mounting a chip test specimen and including a die table having an upper surface with a 90 degree angle arc segment cut-out in the surface thereof to provide an indented flat surface from a periphery of said die table to said 90 degree angle for mounting of a chip test specimen and means in said flat surface for applying vacuum to the test specimen to secure the test specimen in a predetermined position relative to the sides of the 90 degree angle cut-out.

4,881,412

FLOW METERS

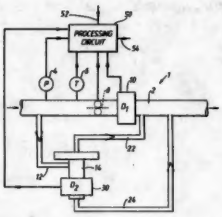
Ronald Northedge, Old Signal Point, La Moye, St. Brelades, Jersey, Channel Islands

Continuation of Ser. No. 895,931, Aug. 13, 1986. This application Aug. 4, 1988, Ser. No. 228,781

Claims priority, application United Kingdom, Aug. 14, 1985, 8520363

Int. Cl.[4] G01F *1/74*

U.S. Cl. 73—861.04 **14 Claims**



1. A flow meter, suitable for location in a sub-sea environment, for continuously measuring the flow of each of up to three distinct fluid components, at least one being liquid and at least one other being gaseous, of a mixture flowing through a pipeline, and comprising:

first sensing means operatively associated with said pipeline and producing continuous first signals representing the values, existing in the mixture, of parameters on which the total volume flow rate of the mixture is dependent,

second sensing means operatively associated with said pipeline and producing a continuous second signal representing the density of the mixture in said pipeline,

a pipe connected into said pipeline in order continuously to withdraw a fraction of said fluid mixture from the pipeline at the pipeline pressure,

a continuous separator having an inlet connected to said pipe to receive said fraction of said fluid mixture at the pipeline pressure and first and second outlets, the separator being operative to separate any gaseous component from the non-gaseous component(s) of said mixture, any said gaseous component being supplied to said first outlet and said non-gaseous component(s) to said second outlet,

third sensing means operatively associated with said separator adjacent said second outlet to produce a continuous third signal representing the combined density of the non-gaseous component(s) of the mixture,

processing means operatively connected to said first, second and third sensing means for continuously receiving therefrom said first, second and third signals and operative to process them, together with known data on the density of each component, to produce outputs respectively representing the flow rate of each fluid component passed through said pipeline, and

further pipe means connecting said two outlets of said separator into said pipeline whereby to feed back into said pipeline, at the pipeline pressure, any said gaseous component and said non-gaseous component(s).

4,881,413

BLOOD FLOW DETECTION DEVICE

Donald K. Georgi, Wayzata; Andrew X. Basile, Minnetonka, and Lloyd E. Graupmann, Plato, all of Minn., assignors to Bio-Medicus, Inc., Eden Prairie, Minn.

Filed Oct. 31, 1988, Ser. No. 265,410

Int. Cl.[4] G01F *1/58*

U.S. Cl. 73—861.12 **35 Claims**

1. A blood flow meter system comprising:

a. a transducer means;

b. a tray means;

c. first electrical terminal means mounted in said tray means;

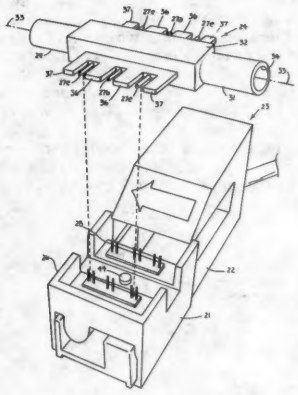
d. magnetic field generating means mounted in said transducer means for generating a magnetic field;

e. said magnetic field generating means including an electromagnet means mounted in said transducer means with poles of said electromagnetic means terminating at opposite sides of an opening in said transducer means;

f. said tray means adapted to move into engagement with said transducer means in said opening to position said first electrical terminals means generally between the poles of said electromagnetic means;

g. means for activating said generating means to generate a magnetic field between the poles of said electromagnetic means;

h. a disposable sensor means constructed of nonmagnetic and non-conductive material having a constricted section of lumen adapted to accommodate blood flow;



i. second electrical terminal means mounted in said sensor means perpendicular to the flow of blood through said sensor means and in communication with said constricted section of lumen;

j. said sensor means positioned in said tray means with said second terminal means in electrical contact with said first electrical means;

k. a first electromagnetic field focus means positioned within the electromagnetic field between the poles of said electromagnetic means and in alignment with the constricted section of lumen of said sensor means to focus said electromagnetic field perpendicular to said blood flow in said constricted section of lumen of said sensor means to amplify the electromagnetic field intensity; and

l. detection means connected to said second terminals for detecting the voltage induced by said flow of blood through said electromagnetic field.

4,881,414

TORQUE DETECTION APPARATUS

Yousuke Setaka, Anjo; Sumio Yanase, Okazaki; Kanji Takeuchi, Gamagori, and Masahiko Miyahara, Chiryu, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed May 10, 1988, Ser. No. 192,187

Claims priority, application Japan, May 12, 1987, 62-115271

Int. Cl.[4] G01L *3/10*

U.S. Cl. 73—862.33 **5 Claims**

1. A torque detection apparatus provided between first and second shafts for measuring a torque applied therebetween, comprising:

an elastic member for coupling between said first and second

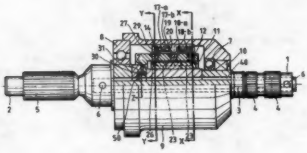
shafts, the torsion angle of said elastic member corresponding to the relative rotational displacement occurring between said first and second shafts, said first and second shafts being arranged to be in opposed relation to each other so that the axes thereof are coincident with each other;

a first rotating body coupling to said first shaft so as to be rotatable in accordance with rotation of said first shaft, said first rotating body being shaped cylindrically;

a second rotating body directly coupled to said second shaft so as to be rotatable in accordance with rotation of said second shaft, said second rotating body being closely positioned with respect to said first rotating body so that a predetermined space is formed therebetween and being shaped cylindrically and provided coaxially with respect to said first rotating body such that said predetermined space therebetween is formed cylindrically;

magnetic field supply means for causing a magnetic flux to flow through a first magnetic flux path which runs from a portion of said first rotating body through said predetermined space to a portion of said second rotating body and for further causing a magnetic flux to flow through a second magnetic flux path which runs from another portion of said first rotating body through said predetermined space to another portion of said second rotating body, said first magnetic flux path being positioned at the first shaft side and said second magnetic flux path being positioned at the second shaft side;

magnetic flux changing means engaged with said first and second rotating bodies for changing the amounts of the magnetic fluxes flowing through said first and second



magnetic flux paths in accordance with a relative rotational displacement occurring between said first and second shafts so that the amount of the magnetic flux flowing through said second magnetic flux path decreases when the amount of the magnetic flux flowing through said first magnetic flux path increases and the amount of the magnetic flux flowing through said second magnetic flux path increases when the amount of the magnetic flux flowing through said first magnetic flux path decreases, said magnetic flux changing means composed of first and second magnetic toothed wheels which are provided in connection with said first magnetic flux path and third and fourth magnetic toothed wheels which are provided in connection with said second magnetic flux path, and further composed of non-toothed magnetic portions, said first and second magnetic toothed wheels being mounted on said first and second rotating bodies, respectively, and said third and fourth magnetic toothed wheels being mounted on said first and second rotating bodies, respectively, said first and second magnetic toothed wheels respectively having pluralities of tooth portions and ones of which are positioned to be in opposed relation to each other and said third and fourth magnetic toothed wheels respectively having pluralities of tooth portions and ones of which are positioned to be opposed relation to each other, the increase and decrease of the magnetic fluxes flowing through said first and second magnetic paths being affected in accordance with the positioning relations between said pluralities of tooth portions of said first and second magnetic toothed wheels and between said pluralities of tooth portions of said third and fourth magnetic tooth wheels which depends upon the degree of the relative rotational displacement occurring between said first and second rotating bodies, said non-toothed magnetic portions being provided between said first and second magnetic toothed wheels and said third and fourth magnetic toothed wheels so as to form a common portion of said first and second magnetic flux paths, and being mounted on said first and second rotating bodies respectively so as to be in opposed relation to each other; and

signal generating means for generating a signal indicative of the difference between the amount of the magnetic flux flowing through said first magnetic flux path and the amount of the magnetic flux flowing through said second magnetic flux path, said signal being used to detect the torque applied between said first and second shafts.

4,881,415

DEVICE AND METHOD FOR HIGHLY ACCURATE MEASUREMENT OF THE THICKNESS OF FIBER MATS

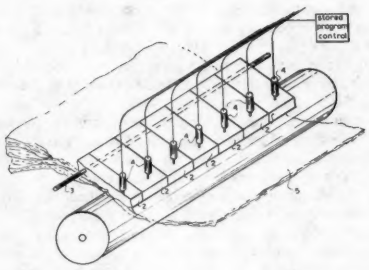
Hubert Hergeth, Kockerellstrasse 3, 5100 Aachen, Fed. Rep. of Germany

Filed Mar. 4, 1988, Ser. No. 164,107

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1987, 3708186

Int. Cl.[4] G01B 5/06

U.S. Cl. 73—865.8 **5 Claims**



1. A method of measuring the thickness of a fiber mat comprising the steps of:

(a) rotating a roller, having a circumference over which a fiber mat is adapted to pass, about an axis of said roller;

(b) at each of a plurality of locations axially spaced apart on said circumference with respective feelers adapted to contact said circumference, generating measured values of displacement of said feelers for each of a plurality of angular positions of said roller during a calibration revolution thereof;

(c) storing each of said values as respective calibration values corresponding to locations upon said circumference;

(d) thereafter passing said fiber mat between said feelers and said circumference by rotating said roller, thereby advancing said mat while said feelers are displaced by said mat;

(e) measuring an actual value of displacement of each of said feelers by said mat for each of said locations upon rotation of said roller; and

(f) correcting an actual value as measured in step (e) with the respective stored value for respective locations to obtain actual measurements of thickness of said mat.

4,881,416

ENGINE STARTER

Shuzoo Isozumi, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

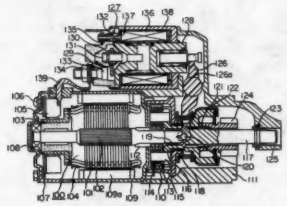
PCT No. PCT/JP87/00730, § 371 Date Jul. 15, 1988, § 102(e) Date Jul. 15, 1988, PCT Pub. No. WO88/02568, PCT Pub. Date Apr. 7, 1988

PCT Filed Oct. 1, 1987, Ser. No. 210,491

Claims priority, application Japan, Oct. 3, 1986, 61-236559; Oct. 6, 1986, 61-153450; Oct. 6, 1986, 61-153451

Int. Cl.[4] F02N *15/06;* **H01H** *51/06;* **H02K** *13/10*

U.S. Cl. 74—7 A **6 Claims**



1. An engine starter comprising:

an electric motor connected to receive electric current via a stationary contact, said electric motor having a cylindrical armature rotating shaft,

an output rotating shaft disposed at a first axial end of said motor in an axially aligned relationship with respect to said armature rotating shaft and supported to slide in an axial direction of said shafts,

a clutch mechanism connected between said armature rotating shaft and said output rotating shaft to transmit rotational force of said armature rotating shaft to said output rotating shaft, and

a solenoid switch which has a moving member disposed on a second axial end of said motor, said moving member including a plunger rod movable in the axial direction responsive to a state of said solenoid switch to push and slide said output rotating shaft by electromagnetic force in the axial direction, said solenoid switch also having a movable contact movable in the axial direction responsive to the state of said solenoid switch to establish and break contact with a stationary contact, thereby supplying current to said motor,

a rear portion of said output rotating shaft and a front portion of said moving member extending into a cylindrical bore of said armature rotating shaft from opposite directions,

said motor including a rear bracket of molded plastic, said rear bracket including a front portion having a bearing recess containing a bearing which journals a rear end portion of said armature rotating shaft wherein said stationary contact is installed on said rear bracket.

4,881,417

TRANSMISSION SYSTEM FOR VEHICLE

Takashi Yoshii, Sakai, and Humitoshi Iinuma, Wakayama, both of Japan, assignors to Kubota Ltd., Osaka, Japan

Filed Nov. 13, 1987, Ser. No. 119,937

Claims priority, application Japan, Apr. 13, 1987, 62-91670; Apr. 13, 1987, 62-91671

The portion of the term of this patent subsequent to Jan. 3, 2006, has been disclaimed.

Int. Cl.[4] B60K *17/28, 25/00*

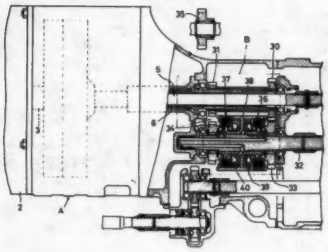
U.S. Cl. 74—15.84 **6 Claims**

1. A transmission system for a vehicle comprising;

an engine output shaft,

a dry type frictional clutch mechanism including a drive member connected to the engine output shaft, a driven member having at least one clutch plate, frictional coupling means disposed between the drive member and the driven member, and control means for controlling the coupling means to couple and uncouple the drive member and the driven member,

a propelling transmission line for driving ground engaging wheels, the propelling transmission line including propelling line input shaft connected to the drive member, transmission means having at least one oil clutch for establishing and breaking drive transmission from the input shaft, and a propelling line change speed device for receiving drive from the transmission means, and



a PTO transmission line including a PTO line input shaft connected to the driven member.

4,881,418

PIVOTABLE SCREW JACK DRIVE

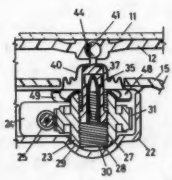
Garry G. Fimeri, Morphett Vale, Australia, assignor to Britax Rainsfords Pty. Ltd., Adelaide, Australia

Filed Dec. 8, 1987, Ser. No. 130,265

Claims priority, application Australia, Dec. 12, 1986, PH9492

Int. Cl.[4] F16H *25/20;* **G02B** *7/18;* **G05G** *11/00*

U.S. Cl. 74—89.14 **10 Claims**



1. In combination with a tiltable element, a pivotable screw jack drive for tilting control of the element, comprising:

a housing, a jacking nut bearing surface of concave part-spherical shape in a wall of the housing,

a single piece jacking nut having an outer surface which is a complementary convex part-spherical shape against which said jacking nut surface bears, an inner threaded surface, and a series of gear teeth spaced around its periphery defining a worm wheel,

a motor assembly within the housing having an output shaft, a drive worm on the output shaft, said drive worm having threads in direct meshing contact with the gear teeth of the worm wheel to drive the worm wheel,

a jacking screw having a first end with a threaded male portion which is threadably engaged in direct mating contact with said inner threaded surface of the jacking nut, and a second end which engages said element for relative pivotal movement about an axis which is perpendicular to the axis of the screw, and

restraining means for restraining the screw from rotation, the arrangement being such that, upon motor rotation, the nut extends or retracts the jacking screw and effects tilting of the element.

4,881,419

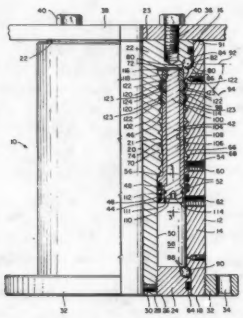
FLUID-POWER BEARING ACTUATOR

Paul P. Weyer, 48811 - 284th Ave. SE., Enumclaw, Wash. 98022

Continuation-in-part of Ser. No. 6,007, Jan. 20, 1987, and a continuation-in-part of Ser. No. 931,223, Nov. 14, 1986, and a continuation-in-part of Ser. No. 881,904, Jul. 3, 1986, Pat. No. 4,741,250, which is a continuation-in-part of Ser. No. 662,256, Oct. 17, 1984, Pat. No. 4,667,528, and a continuation-in-part of Ser. No. 692,293, Jan. 17, 1985, Pat. No. 4,683,767, and a continuation-in-part of Ser. No. 803,954, Dec. 2, 1985, Pat. No. 4,691,582, which is a continuation-in-part of Ser. No. 575,228, Jan. 30, 1984, Pat. No. 4,590,816. This application Nov. 30, 1987, Ser. No. 126,837

Int. Cl.[4] F01B *3/08*

U.S. Cl. 74—89.15 **34 Claims**



1. A fluid-powered, rotary actuated support for a crane or other device platform, comprising:

an elongated generally cylindrical body having first and second ends with a generally vertical axial orientation during use, said body having an outer surface and having at least one groove formed on an end portion of an inner surface thereof toward one of said first or second body ends, said body further having first and second axially spaced apart fluid ports therein for introducing pressurized fluid within said body and a stationary seal axially positioned between said ports axially away from said grooved body end portion toward an other one of said first or second body ends, said first port being to a side of said stationary seal axially toward said grooved body end portion and said second port being to a side of said stationary seal axially away from said grooved body end portion;

a drive member having a hollow generally cylindrical drive shaft portion extending generally coaxially within said body generally between said first and second body ends, and an annular flange portion attached to an end portion of said drive shaft portion towards said first body end at a position adjacent to and confronting the platform, said flange portion having attachment means for providing driving attachment to the platform with the platform positioned generally concentric with said cylindrical body at said first body end and rotatable relative thereto about a common generally vertical axis through a generally horizontal plane during use, said flange portion providing rotational drive between said body and the platform, said drive shaft and flange portions being formed as an integral unit free of connection joints therebetween, said flange portion projecting generally radially outward from said drive shaft portion to and beyond said inner surface of said body;

load-carrying bearing means disposed between said flange portion and said body at said first body end for allowing relative rotary motion between said drive member and said body for selective rotation of the platform, said bearing means including a first ball race formed in said flange portion and a second ball race formed in said body towards said first body end with a plurality of balls disposed between said first and second ball races, said first and second ball races having a center ball contact angle of from 30 to 60 degrees relative to said horizontal plane when in use, said second ball race being formed in a portion of said body radially outward of said body groove formed on said inner body surface and radially inward of said body outer surface, said bearing means providing support against both axial thrust and radial loads applied to said flange portion by the platform while carrying the crane or other device thereon and its load;

bearing means disposed between said drive member and said body for providing support against axial thrust applied to said drive member in the direction of said first end; and

linear-to-rotary transmission means disposed within said body and operable in response to fluid pressure introduced within said body through said ports for providing relative rotational movement between said drive member and said body, said transmission means including a reciprocating piston with means for engaging said body groove and having a smooth surface portion slidably engaging said stationary seal as said piston axially reciprocates within said body to define a pair of fluid tight compartments to each side of said piston, each said compartment being in fluid communication with a different one of said ports, said piston having an end limit of travel toward said other one of said first or second body ends located between said second port and said other one of said first or second body ends.

4,881,420

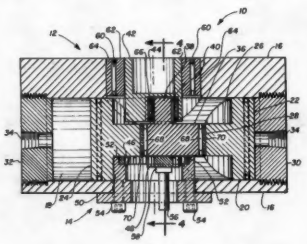
POWER ACTUATOR WITH LOST MOTION ARRESTER

Herman L. Paul, Jr., 370 Dogwood La., R.D. 5, Lebanon, Pa. 17042

Filed Dec. 5, 1988, Ser. No. 279,655

Int. Cl.[4] F16K *31/163*

U.S. Cl. 74—109 **5 Claims**



1. An improved power actuator with lost motion arrester for converting rectilinear motion to oscillatory motion to be employed in coupled use with a rotary device for accomplishing remote control adjustment set and adjustment set hold thereof, comprising in combination a body block provided with a longitudinal cylindrical bore adapted to receive a double faced piston reciprocally mounted therewithin said double faced piston having a right piston face and a left piston face connectably joined by an intermediate interconnecting means having a centrally intermediate symmetrically disposed opening therethrough along an axis normal to that of said cylindrical bore, an oscillatable valve stem coupling rotatably mounted in said

body block at an axis normal to that of said cylindrical bore, a rotor rotatably mounted in the opening of said connecting means said rotor being operatively connected to said oscillatable valve stem coupling about an axis parallel thereto and adapted to cooperatively rotate whenever said piston is moved, a rotor pin connecting said oscillatable valve stem coupling and said rotor and positioned eccentrically to their axes of rotation, and a lost motion arrester comprised of a circular rack and pinion timing gear assembly operatively assembled to said body block and said rotor pin and adapted to cooperatively displace whenever said piston is moved and automatically set hold said oscillatable valve stem coupling in a set locked position of adjustment whenever said piston is stopped.

4,881,421

DRIVE WITH OVERLOAD SAFETY COUPLING

Stefan Schön, Düdingen, Switzerland, assignor to Elpatronic AG, Switzerland

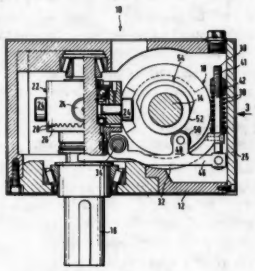
PCT No. PCT/EP87/00512, § 371 Date Mar. 22, 1988, § 102(e) Date Mar. 22, 1988, PCT Pub. No. WO88/02079, PCT Pub. Date Mar. 24, 1988

PCT Filed Sep. 9, 1987, Ser. No. 183,737

Claims priority, application Fed. Rep. of Germany, Sep. 13, 1986, 3631215

Int. Cl.[4] F16H *35/10, 27/04*

U.S. Cl. 74—412 TA **9 Claims**



1. A stepping drive having a first rotatable member adapted to be driven by a drive shaft, a second rotatable member adapted to drive a driven sahft, said first and second rotatable members engaging each other for transforming a continuous rotation of said first rotatable member into an intermittent rotation of said second rotatablel member, one of said rotatable members being connected to its associated shaft by coupling means, a retaining member being arranged to exert a retaining force onto said coupling means to keep the same in an engaged condition, and control means associated with one of said shafts, said control means establishing a predetermined relationship between said retaining force and the angular position of said one shaft.

4,881,422

ANTI-LASH GEAR MECHANISM

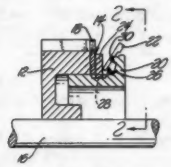
Joel M. Maguire, Dearborn, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 15, 1988, Ser. No. 232,072

Int. Cl.[4] F16H *55/18*

U.S. Cl. 74—440 **2 Claims**

1. A lash removal apparatus for gearing comprising: a driven gear having a predetermined number of teeth and being operatively connected with a torque delivery means for transmitting torque; an anti-lash gear rotatably supported adjacent said driven gear and having a predetermined number of teeth at least one greater than the number of teeth on said driven gear; gear means meshing with said driven gear and said anti-lash gear and being forced into engagement between and with respective teeth on said driven gear and said anti-lash gear due to the tooth differential therebetween; resilient means for applying a force for urging said anti-lash gear into frictional



engagement with said driven gear for encouraging conjoint rotation thereof and for maintaining engagement with said gear means; and speed responsive means for urging said resilient means to reduce said applying force when the speed of the driven gear increases above a predetermined value to reduce the engagement force.

4,881,423

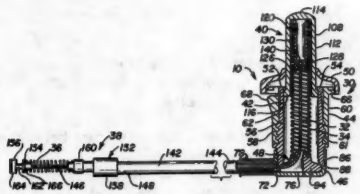
CABLE ACTUATING ASSEMBLY

Thomas Troiano, 1725 McManus St., Troy, Mich. 48084, assignor to Thomas Troiano, Battle Creek, Mich.

Filed May 9, 1988, Ser. No. 191,321

Int. Cl.[4] F16C *1/10*; B60R *22/00*

U.S. Cl. 74—501.6 **13 Claims**



1. A cable operated assembly for actuating a device, said assembly comprising:

a housing;

actuating means mounted to said housing for movement relative thereto between return and actuating positions;

first biasing means urging said actuating means toward said return position;

a cable reciprocally movable in return and actuating directions relative to said housing and having first and second ends, said first end being positioned within said housing, said second end being engageable with a device to be actuated;

means for connecting said first end of said cable to said actuating means, said connecting means permitting movement of said cable first end relative to said actuating means when said actuating means is moved toward said actuating position, said connecting means limiting movement of said cable first end relative to said actuating means when said actuating means is moved toward said return position thereby to move said cable in said return direction;

second biasing means having a biasing force less than that of said first biasing means and urging said cable in said actuating direction, said second biasing means being normally compressed; and

means for routing said cable first end from said housing at

90° with respect to directional movement of said actuating means, said routing means being disposed in said housing;

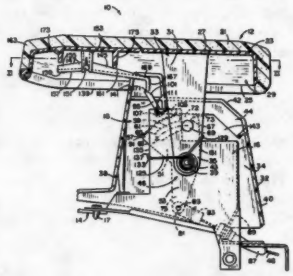
whereby movement of said actuating means toward said actuating position in response to external forces exerted thereon acts to compress said first biasing means and free said cable from said actuating means to permit said cable to be drawn in said actuating direction through said routing means exclusively by said second biasing means thereby to deter interference with movement of said cable in said actuating direction by said housing.

4,881,424

BRAKE ACTUATOR

Russell L. Clark, Zeeland, and Roger Bomgaars, Mattawan, both of Mich., assignors to Prince Corporation, Holland, Mich.

Filed May 19, 1988, Ser. No. 195,806
Int. Cl.[4] G05G *1/04, 5/06*
U.S. Cl. 74—523 **17 Claims**



1. A armrest including a parking brake actuator for use in actuating and releasing a vehicular parking brake through a brake control element comprising:

a frame;

an armrest movably mounted on said frame between a first position and a second position;

said brake control element extending to an assembly between said frame and said armrest; and

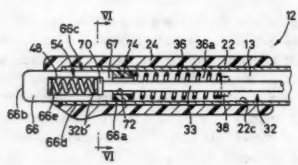
said assembly coupled to said brake control element so that the parking brake is actuated as said armrest is moved from said first position toward said second position.

4,881,425

PARKING-BRAKE OPERATING DEVICE

Kimio Kanno, Toyota, Japan, assignor to Toyoda Iron Works Co., Ltd., Aichi, Japan

Division of Ser. No. 199,146, May 26, 1988. This application Apr. 14, 1989, Ser. No. 338,094
Int. Cl.[4] G05G *1/10*
U.S. Cl. 74—538 **6 Claims**



1. A parking-brake operating device for selectively placing a parking brake in an operative and an inoperative position thereof, the device including (a) an operating lever which is selectively placed in a first and a second position thereof to place said parking brake in said operative and inoperative position, respectively, said lever being disposed pivotably about a first pivot axis and connected to said parking brake through a brake cable, said lever including a free-end portion having a free end, said portion having a longitudinal hole which is formed therein longitudinally of the lever and is open in said free end; (b) a stationary sector having a plurality of teeth; (c) a pawl supported by said lever pivotably about a second pivot axis parallel to said first pivot axis, said pawl having a first and a second arm; (d) a knob having a first and a second end, and fitted, over an axial part thereof having said first end, in said longitudinal hole of said lever such that said knob is retractable inward upon operation thereof on said second end, said axial part having an axial recess which is formed therein and is open in said first end and a lateral surface adjacent to said first end, said knob having at said first end a stopper protruding radially inward from an inner wall surface thereof defining said axial recess; (e) a release rod having a first and a second end and a shaft including said first end, said second arm of said pawl being connected to said first end, said rod including a head having said second end, said head being fitted in said axial recess of said knob such that said head is engaged with said stopper; (f) a first spring possessing a first biasing force for permitting said pawl to be pivoted about said second pivot axis in a first direction in which to cause said first arm of the pawl to be engaged with said plurality of teeth of said sector; and (g) a second spring fitted in said axial recess of said knob and possessing a second biasing force for permitting said head of said rod to be engaged with said stopper of the knob, said second biasing force being determined such that, upon retraction of said knob when said lever is held in said second position, said second spring causes said rod to be moved relative to said lever with said head engaged with said stopper, whereby said pawl is pivoted in a second direction opposite to said first direction and said first arm of the pawl is released from the engagement with said sector, and that, upon retraction of said knob when the lever is held in said first position, said second spring permits said knob to be moved relative to said rod, while said second biasing force is overcome by pivot resistance associated with the forced engagement between said pawl and said sector due to tension force of said brake cable, whereby said rod is not moved relative to said lever and said pawl is not released from said forced engagement,

the improvements comprising:

an annular sleeve disposed in said longitudinal hole of said operating lever, said annular sleeve having an inside hole formed therethrough axially thereof, said release rod being disposed in said longitudinal hole such that said shaft of said rod extends through said inside hole of said annular sleeve, whereby interference between said head of the rod and said lever is prevented.

4,881,426

DUAL-TYPE DAMPER DEVICE

Minoru Serizawa, Komaki, and Yutaka Tazuke, Kasugai, both of Japan, assignors to Tokai Rubber Industries, Ltd. and Toyota Jidosha Kabushiki Kaisha, both of, Japan

Division of Ser. No. 917,543, Oct. 10, 1986, Pat. No. 4,794,816. This application Sep. 28, 1988, Ser. No. 250,449
Claims priority, application Japan, Oct. 15, 1985, 60-157477; Dec. 25, 1985, 60-200984
Int. Cl.[4] F16F *15/10*
U.S. Cl. 74—574 **6 Claims**

1. A dual-type damper device for damping vibration of a rotation axle, comprising:

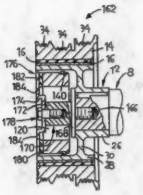
a damper pulley including a boss portion joined to said rotation axle, a cylindrical portion located radially outwardly of said boss portion, and a connection portion connecting said boss portion and said cylindrical portion;

a first damper-mass member disposed radially outwardly of

said cylindrical portion of said damper pulley, such that said first damper-mass member is spaced apart from, and concentric with, said cylindrical portion;

a first resilient member interposed between said cylindrical portion of said damper pulley and said first damper-mass member;

a second damper-mass member having a cylindrical shape and two axial ends, said second damper-mass member being disposed in an inner space of said cylindrical portion of said damper pulley, such that a space is provided between said second damper-mass member and said cylindrical portion, said space permitting said second damper-mass member to be radially displaced relative to said cylindrical portion, without being brought into butting contact with said cylindrical portion, upon application of the vibration of the rotation axle to the dual-type damper device;



a set bolt for joining said boss portion of said damper pulley to said rotation axle, said set bolt being fixed to said rotation axle and extending in an inner space of said second damper-mass member;

a circular member fixed at a central portion thereof to said set bolt; and

a second resilient member disposed between said circular member and one of the axial ends of said second damper-mass member which is opposed to said circular member, said second resilient member securing said second damper-mass member to an outer annular portion of said circular member, said second resilient member being subjected to shear deformation due to relative radial displacement between said circular member and said second damper-mass member.

4,881,427

CRANKSHAFT OF INTERNAL COMBUSTION ENGINE AND METHOD OF PRODUCING THE SAME

Kousuke Yasutake, Kawagoe, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 861,653, May 5, 1986, abandoned, which is a continuation of Ser. No. 495,696, May 18, 1983, abandoned. This application Jun. 2, 1988, Ser. No. 205,032

Claims priority, application Japan, Oct. 21, 1982, 57-185180

Int. Cl.[4] F16C *3/04*

U.S. Cl. 74—603 **5 Claims**

1. A crankshaft comprising:

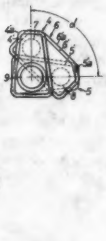
a forged crankshaft body, said crankshaft body including

a plurality of adjacent web core portions including two outer web core portions and one central web core portion located between the two outer web core portions,

crank pins interconnecting adjacent web core portions, and

journals defining an axis of rotation of the crankshaft and extending axially from the said outer web core portion, said outer web core portions being trapezoidal in section as viewed along said axis of said journals, said trapezoidal web core portions having a lesser-width at crank pin interconnected portions thereof than at journal extending portions thereof, said trapezoidal outer web core portions having upper and lower sides, said upper side being parallel to and shorter in length than said lower side, said trapezoidal web core portions having left and right divergently inclined sides extending between the upper and lower sides; and

a plurality of balancer weights, each of said balancer weights being integrally formed with and surrounding a corresponding one of said web core portions, said balancer weights each having a substantial portion thereof disposed



offset with respect to the journal extending portion of said web core portions to a side remote from said crank pin interconnected portions, wherein said central web core portion being directly connected with said two outer web core portions by said crank pins and said central web core portion having a substantially rectangular shape with two corners thereof, which are remote from the rotational axis of the crankshaft, being cut away.

4,881,428

THROTTLE VALVE CONTROL APPARATUS FOR INTERNAL COMBUSTION ENGINE

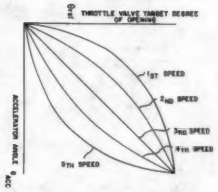
Yoshikazu Ishikawa; Kouji Yamaguchi, and Kouji Sasajima, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 18, 1987, Ser. No. 63,398

Claims priority, application Japan, Jun. 18, 1986, 61-143421

Int. Cl.[4] B60K *41/06*

U.S. Cl. 74—859 **4 Claims**



1. A control apparatus for a throttle valve disposed in an intake system of an internal combustion engine, for controlling a degree of opening of said throttle valve, comprising:

accelerator actuation detection means for producing an output representing a current actuation position of an accelerator pedal;

setting means, responsive to said accelerator actuation detection means, for setting a target degree of opening for said throttle valve according with said current actuation position of said accelerator pedal detected by said accelerator actuation detection means;

throttle valve opening degree detection means, operatively connected to said throttle valve, for producing an output

representing an actual degree of opening for said throttle valve;

drive means, responsive to said setting means and said throttle valve opening degree detection means, for driving said throttle valve in a direction to reduce an amount of deviation between said actual degree of opening for said throttle valve and said target degree of opening; and

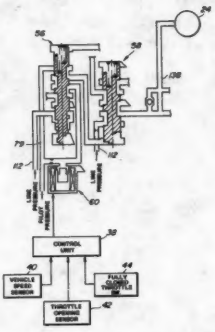
shift position detection means for detecting a current shift position among a plurality of shift positions of a vehicle's transmission which is coupled to said internal combustion engine; wherein said setting means selecting, from a plurality of different throttle valve target opening degree characteristics corresponding to accelerator pedal actuation positions, a characteristic corresponding to the detected shift position and utilizing the selected characteristic for setting said target degree of opening of said throttle valve in accordance with said current accelerator pedal actuation position.

4,881,429

SHIFT CONTROL ARRANGEMENT FOR AUTOMATIC TRANSMISSION

Masayuki Kobayashi, Isehara, and Masahiro Takiguchi, Fuji, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama and Japan Automatic Transmission Co., Ltd., Fuji, both of, Japan

Filed Apr. 29, 1988, Ser. No. 188,509
Int. Cl.[4] B60K *41/18, 41/16*
U.S. Cl. 74—867 **7 Claims**



1. In a transmission

a one-way clutch;

a first clutch, said first clutch being directly connected with said one way clutch;

a second clutch, said second clutch being connected in parallel with said first clutch and said one-way clutch;

a solenoid valve, said solenoid valve having first and second operative states, said solenoid valve being arranged to induce said second clutch to engage when in said first operative state;

means for discerning a transmission upshift operation;

means for detecting an engine throttle valve assuming a closed position; and

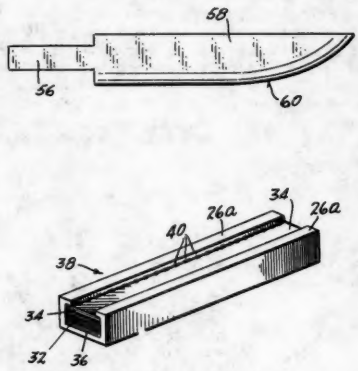
solenoid energization means responsive to said upshift discerning means and said closed throttle valve detection means, for conditioning said solenoid to assume said first state for a predetermined time.

4,881,430

METHOD OF MAKING HETEROGENEOUS BLADE-LIKE METALLIC CUTTER MEMBER

Arthur J. Hubbard, 574 Cutlers Farm Rd., Monroe, Conn. 06468

Filed Sep. 6, 1988, Ser. No. 240,504
Int. Cl.[4] B21K *11/02*
U.S. Cl. 76—104 R **21 Claims**



1. The method of making a heterogeneous blade-like member constituted of different metals, which includes the steps of working metal to form an open metal enclosure, depositing a stack of different metallic foils in said enclosure through the opening thereof, folding-in portions of said enclosure on said stack of foils to form with said enclosure a tight assemblage, heating said assemblage and applying force to said heated assemblage to attenuate it and bond together the foils of said stack, and thereafter removing said enclosure from the attenuated stack of foils.

4,881,431

METHOD OF MAKING A SINTERED BODY HAVING AN INTERNAL CHANNEL

Jürgen Bieneck, Essen, Fed. Rep. of Germany, assignor to Fried. Krupp Gesellschaft mit beschränkter Haftung, Essen, Fed. Rep. of Germany

Division of Ser. No. 3,262, Jan. 14, 1987, Pat. No. 4,813,823.
This application May 23, 1988, Ser. No. 197,264
Claims priority, application Fed. Rep. of Germany, Jan. 18, 1986, 3601385
Int. Cl.[4] B21K *5/04;* B22F *7/06*
U.S. Cl. 76—108 R **21 Claims**

1. A method for manufacturing a sintered body having a longitudinal axis and at least one internal channel spaced from the axis, comprising:

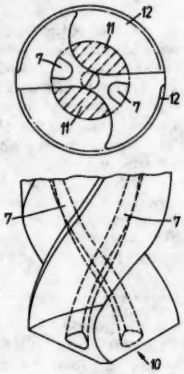
providing a first member of a sinterable hard metal in the form of a core having an exterior surface;

providing a second member of a sinterable and heat shrinkable hard metal in the form of a hollow tubular casing having an interior surface which initially encloses a region larger in cross section than said first member;

forming in said surface of one of said members at least one groove corresponding to the at least one channel;

inserting said first member into said second member after said step of forming a groove; and

after said step of inserting, finish sintering at least said second member and shrinking said second member for bond-



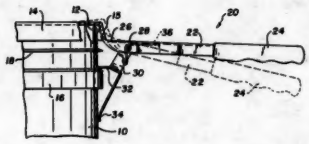
ing said members together at said surfaces by diffusion to form a composite member.

4,881,432

LID REMOVING TOOL

George M. Olorenshaw, 11810 Stephens Street, Maple Ridge, B.C. V2X 6S3, and Al Macedo, P. O. Box 2462, Squamish, B.C. VON 3GO, both of Canada

Filed Apr. 10, 1989, Ser. No. 335,486
Int. Cl.[4] B67B 7/00
U.S. Cl. 81—3.36 4 Claims



1. A tool for removing a lid from a container, the lid having an overlapping rim, and the container having an integral peripheral rib extending around a container wall below the lid, the tool comprising:

a lever arm having a handle at one end and a rim engaging means at the other end,

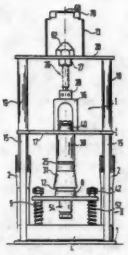
an anchor pivoted at a pivot position on the lever arm adjacent the rim engaging means, the anchor having a top member adapted for engagement with the peripheral rib on the container wall, and a bottom stabilizing member adapted to rest against the container wall below the peripheral rib, such that when the tool is engaged with a container, the rim engaging means positioned under the overlapping rim of the lid, and the top member of the anchor engaging the peripheral rim of the container wall, lever action of the tool raises the lid from the container.

4,881,433

REMOTE MANIPULABLE DEVICE FOR ESTABLISHING A TRANSPORT CONNECTION WITH A REMOTE MANIPULABLE TOOL

Jürgen Forster, Minden, and Manfred Bramer, Waldmohr, both of Fed. Rep. of Germany, assignors to Duetsche Gesellschaft fur Wiederaufarbeitung von Kernbrenstoffen mgH, Hanover, Fed. Rep. of Germany

Filed Jul. 24, 1987, Ser. No. 77,285
Claims priority, application Fed. Rep. of Germany, Aug. 7, 1986, 3626740
Int. Cl.[4] B25B 21/00
U.S. Cl. 81—55 14 Claims



1. In a combination of a remote manipulable tool with a movable remotely actuable device, said tool actuating said movable device for establishing and releasing a connection between a first subassembly and a second subassembly, said movable remotely actuable device comprising a first retaining element adapted to establish a transport connection with said tool, a second retaining element connected with one of said first and second subassemblies, said second retaining element being movably mounted in said movable device and being partially configured for a direct mechanical engagement with said tool in such a manner that said second retaining element is reciprocally movable in said movable device upon actuation of said tool between two extreme positions, said first retaining element and said second retaining element being constructed so that said second retaining element holds an actuating portion of said tool fixed between said first retaining element and said second retaining element in one of said two extreme positions but permits said tool to be brought into and out of said engagement in another of said extreme positions so as to release or establish the connection between said first subassembly and said second subassembly.

4,881,434

TOOL FOR THREADING OVERSIZED ROPE THROUGH OPENING IN AN ELASTIC STRAP

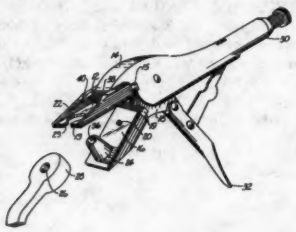
Robert L. Keller, 8512 Keystone, Omaha, Nebr. 68103

Filed May 9, 1988, Ser. No. 191,643
Int. Cl.[4] B25B 7/02
U.S. Cl. 81—426 9 Claims

1. A tool for threading oversized rope through an opening in an elastic strap comprising:

a plier type implement having an upper jaw and a lower jaw movable between an open position and a closed position, said upper jaw including a opening therein and said lower jaw including a cone shaped hollow member having an inside surface and an outside surface, said cone shaped hollow member extending upwardly toward said upper jaw such that said cone shaped hollow member is disposed in alignment with said upper jaw opening when said jaws are in the closed position, wherein the outside surface of said cone shaped hollow member is disposed for insertion

into an opening in an elastic strap and the inside surface of the cone shaped hollow member allows an oversized rope



to pass therethrough and be threaded through the opening in the elastic strap.

4,881,435

POWER TOOL FOR TWO STEP TIGHTENING OF SCREW JOINTS

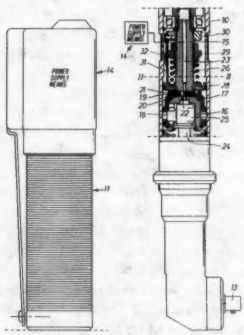
Gunnar C. Hansson, Stockholm, Sweden, assignor to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Jan. 21, 1988, Ser. No. 146,711

Claims priority, application Sweden, Jan. 27, 1987, 8700294

Int. Cl.[4] B25B *23/151*

U.S. Cl. 81—469 **2 Claims**



1. A power supply tool for two step tightening of screw joints, the two steps including a first high speed screw joint tightening step and a second low-speed screw joint tightening step, the power tool comprising:

a housing;

a rotation motor supported in said housing;

an output spindle rotated by said motor and connectable to a screw joint to be tightened;

a power transmission including a releasable clutch means for coupling said motor to said output spindle in an unreleased state and for disconnecting said motor from said output spindle in a released state;

power supply means coupling said motor to a power source for supplying power to said motor;

said clutch means comprising:

a yielding element which is axially movable against the action of a bias spring for releasing said clutch means to its released state to disconnect said motor from said output spindle; and

shift means responsive to the speed of screw joint tightening for shifting the mode of operation of said clutch means between (i) a torque responsive releasing action whereby said clutch means is able to occupy its released state during the first, high speed screw joint tightening step and (ii) a non-releasing action whereby said clutch means is prevented from occupying its unreleased state during the second, low speed screw joint tightening step;

said shift means comprising at least one lock finger which is radially movable by centrifugal action during rotation of said motor from (i) an active position in which said at least one lock finger blocks said yielding element against said axial movement, to (ii) an inactive position in which said yielding element is unblocked and free to move axially as a predetermined torque level is reached in said clutch means; and

release detecting means coupled to said clutch means and to said power supply means for causing said power supply means to at least substantially reduce the power supply to said motor as said clutch means is released to its released state during the first, high speed screw joint tightening step.

4,881,436

TRANSVERSE CUTTER FOR SHEET MATERIALS

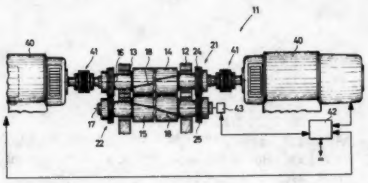
Jörg Rommel, Reutlingen, Fed. Rep. of Germany, assignor to Bielomatik Leuze GmbH & Co., Fed. Rep. of Germany

Continuation of Ser. No. 20,752, Mar. 2, 1987, abandoned. This application Nov. 1, 1988, Ser. No. 267,611

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1986, 3608111

Int. Cl.[4] B23D *25/12;* B26D *1/40*

U.S. Cl. 83—342 **10 Claims**



1. A transverse cutter for sheet materials, especially paper, comprising:

two rotatable cutter spindles,

at least one knife disposed at the periphery of each cutter spindle,

a drive for the cutter spindles, and

at least one gear wheel drive for synchronizing rotation of the two cutter spindles, said at least one gear wheel drive having mutually co-operating gear wheels in meshing engagement under pre-stress and a resilient element being disposed between one of said gear wheels and one of said cutter spindles, said resilient element being resilient to permit displacement in a radial direction, whereby said resilient element permits limited resilient radial movement at a point of circumference where the cooperating gear wheels come closest together during each rotation thereof.

4,881,437

ANGLE GUIDE DEVICE

Albert A. Macksoud, 558 Bevel Line Rd., R.R. #1, Leamington, Province of Ontario, Canada (N8H 3V4)

Continuation of Ser. No. 1,819, Jan. 8, 1987, abandoned. This application Jun. 8, 1988, Ser. No. 206,951

Claims priority, application Canada, Apr. 11, 1986, 506524

Int. Cl.[4] B27B *27/08*

U.S. Cl. 83—477.2 **5 Claims**

1. A device for guiding a workpiece to be cut at a right angle and at a plurality of angles on a table saw, said table saw in-

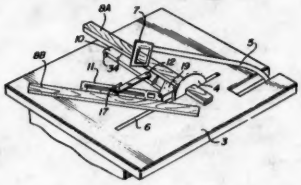
cluding a blade, a tabletop and a cutting line along which said blade passes for cutting said workpiece; said device comprising:

a first guide means fixed to said tabletop adjacent said cutting line at a permanent 90° angle with respect to said cutting line;

a second guide means interconnected to said first guide means, said second guide means being selectively adjustable with respect to said first guide means for adjusting the angle of said second guide means with respect to said cutting line;

a first connecting link pivotally interconnecting said first and second guide means allowing pivotal movement of said second guide means with respect to said first guide means;

a second connecting link interconnecting said first and second guide means for controlling said pivotal movement of said second guide means with respect to said first guide means, said second connecting link having opposed ends



with one end pivotally attached to one of said first and second guide means and said other end slideably connected to said other of said first and second guide means for longitudinal movement there along;

said first and second guide means each having inner sides facing one another and outer sides, said outer side of said first guide means being adapted to receive a workpiece in abutting engagement and position the workpiece across said cutting line at a right angle to said cutting line for cutting the workpiece at a right angle;

said outer side of said second guide means being adapted to receive a workpiece in abutting engagement and position the workpiece across said cutting line at a preselected angle to said cutting line for cutting the workpiece at said preselected angle;

whereby said device may be used for guiding a workpiece for perpendicular cuts and for preselected angled cuts by abutting a workpiece against said outer side of said first or second guide means.

4,881,438

BRUSH CUTTER BLADE

J. Dana Pinney, P.O. Box 877, Medford, Oreg. 97501

Continuation-in-part of Ser. No. 929,636, Nov. 12, 1985, abandoned, which is a continuation-in-part of Ser. No. 754,761, Jul. 15, 1985, abandoned. This application Nov. 24, 1987, Ser. No. 124,673

Int. Cl.[4] B27B *33/12*

U.S. Cl. 83—840 **5 Claims**

1. A brush cutting blade for a motor driven brush cutting machine, said blade comprising,

a circular disc having opposite planar parallel side surfaces and a smooth continuous periphery,

and a plurality of cutter teeth individually attached to the peripheral margin of said disc,

said teeth being of alternating left and right configuration and being mounted in peripherally spaced relation alternately on opposite sides of said disc

each of said teeth comprising a flat plate portion abutting a side surface of said disc,

fastener means extending through each of said tooth plate portions and said disc rigidly to secure said teeth to said disc,

each of said teeth having a single cutter element consisting of a side wall portion integral with said plate portion and an outer flange portion,

said side wall portion being laterally offset from said plate portion, the amount of offset progressively decreasing from the forward end to the rearward end thereof,

said flange portion extending from said side wall portion substantially at right angles to disc side surfaces across the median plane of said disc,

said flange portion being inclined downwardly at an angle of between seven and ten degrees with respect to a perpendicular to a radius of said disc intersecting the forward edge of said flange portion,

the forward edge of said side wall portion and said flange portion of each cutter element being formed with a beveled surface defining a cutting edge,

and a depth gauge integral with the forward end portion of each tooth plate portion positioned forwardly of said cutter element, said depth gauge defining an upwardly facing flat surface sloping upwardly from its forward to its rearward edge at an angle of between twenty-five and thirty-five degrees with respect to a plane parallel to the axis of said disc and normal to a radius of the disc intersecting the trailing edge of said depth gauge,

said depth gauge surface having a width of between 0.075 to 0.275 inch,

the top trailing edge of said depth gauge being spaced between 0.025 and 0.030 inch below the cutting edge of said flange portion.

4,881,439

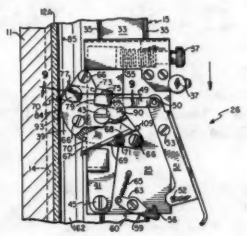
CUTTING APPARATUS FOR SHEET MATERIAL

Robert E. Biedermann, Brick, N.J., and Albert J. Countryman, New Brighton, Minn., assignors to Esselte Pendaflex Corporation, Garden City, N.Y.

Filed Apr. 14, 1988, Ser. No. 181,433

Int. Cl.[4] B26D *3/08*

U.S. Cl. 83—879 **14 Claims**



7. Apparatus for scoring a glass sheet material or the like comprising:

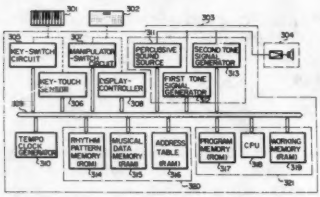
a. a holder for said sheet material;
b. a slide movable along said material;
c. a glass scoring element;
d. a carrier fixedly holding said element;
e. a first member on which said carrier is pivotally mounted, said first member being freely pivotally connected to said slide;
f. resilient means urging said first member and carrier toward said material;
g. means responsive to movement of said slide and including a curved periphery on said carrier facing said material, with one portion of said periphery spaced from the edge of said scoring element by a distance less than the thickness of said material to cause said carrier to pivot relative to said first member to cause said carrier to lift said scoring element over the edge of said material upon movement of said slide from a position above the upper edge of said material to a position opposite said material.

4,881,440

ELECTRONIC MUSICAL INSTRUMENT WITH EDITOR

Tadasu Kakizaki, Shizuoka, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Filed Jun. 24, 1988, Ser. No. 210,926
Claims priority, application Japan, Jun. 26, 1987, 62-160754; Jun. 26, 1987, 62-160755
Int. Cl.[4] G10H *1/38, 1/46, 7/00*
U.S. Cl. 84—609 **14 Claims**



1. An electronic musical instrument capable of producing musical tones on the basis of a sequence of pieces of musical data information, said musical tones representing a music, said pieces of musical data information being representative of attributes of said musical tones, comprising:
(a) memory means for storing said pieces of musical data information grouped by time durations with respect to a beginning of a performance;
(b) modification range defining means for specifying a head position and a terminational position in said pieces of musical data information, said head position and said terminational position defining a part of said music;
(c) setting means for providing a variation for modifying one of said attributes;
(d) modifying means for modifying said pieces of musical data information between said head position and said terminational position on the basis of said variation.

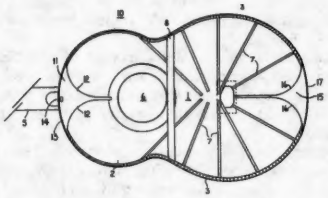
4,881,441

STRINGED INSTRUMENT BLOCKING SYSTEM

John M. Larsen, Rte. 1, Box 23, Marsing, Id. 83639

Filed Jun. 16, 1988, Ser. No. 207,244
Int. Cl.[4] G01D *3/02*
U.S. Cl. 84—291 **3 Claims**

1. In a stringed instrument having a neck connected to a sound box which is constructed from a top, back, and sides disposed about a longitudinal axis, a blocking system which comprises:
a neck block having a substantially isosceles triangular shape, the equal length sides of which being concave and centered about the longitudinal axis, said neck block is supportively attached to said neck and further attached to said sound box top, back, and sides;



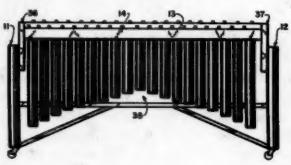
a tail block having a substantially isosceles triangular shape, the equal length sides of which being concave and centered about the longitudinal axis, said tail block being slidably attached to the bottom side wall.

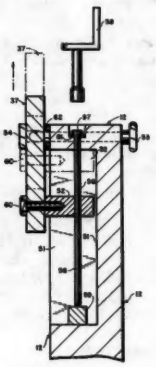
4,881,442

PLAYING HEIGHT ADJUSTMENT FOR KEYBOARD PERCUSSION INSTRUMENTS

Leigh H. Stevens, Asbury Park, N.J., assignor to The Selmer Company, Elkhart, Ind.

Filed Oct. 28, 1987, Ser. No. 114,482
Int. Cl.[4] G10D *13/08*
U.S. Cl. 84—403 **9 Claims**





1. In a musical percussion instrument having a pair of spaced end supports, a generally horizontal array of tuned elements for producing musical tones between said end supports, and support rails for supporting said array of tuned elements, the improvement comprising:
a pair of intermediate supports secured to opposing ends of said support rails, each intermediate support being mounted on a respective end support for allowing vertical translation of said intermediate supports with respect to said end supports;

a pair of jack screws each rotatably mounted and supported on a respective end support;

coupling means for coupling each jack screw to a respective intermediate support for raising said intermediate support when said jack screw is rotated in one direction and for lowering said intermediate support when said jack screw is rotated in an opposite direction, said coupling means including a screw block secured to each intermediate support, said screw block having a tapped hole for threadedly receiving said jack screw;

said end support including a bearing block for supporting said jack screw;

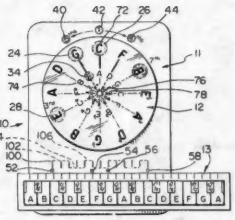
whereby height adjustment of said bar support rails and said tuned elements in a vertical plane relative to said end supports is accomplished by selective rotation of said jack screws.

4,881,443

MUSIC TEACHING APPARATUS

Howard W. Bertram, Carleton Place, Ontario, Canada, assignor to Mutech - Music Technologies, Inc., Ontario, Canada

Filed Aug. 3, 1988, Ser. No. 227,617
Int. Cl.[4] G09B *15/02*
U.S. Cl. 84—473 **19 Claims**



1. Music teaching apparatus comprising a display base, a circular display disc rotatably associated with said base, and a display keyboard moveable relative to said display base;

said base having first indicia including a circular array of twelve equally spaced, radially extending, lines and having second indicia spaced from said first indicia, said second indicia including a linear array of thirteen, equally spaced, parallel lines;

said disc having third indicia in a circular array, said third indicia representing twelve notes of an octave, which notes are at intervals of two and one-half tones on a musical scale, and the progression of notes, in a first direction, being according to 4th intervals and, in a second, opposite direction, being in accordance with 5th intervals, said notes being angularly spaced for registration with lines of said first indicia;

said keyboard providing fourth indicia comprising representation of at least one octave of a piano keyboard including white and black keys, the spacing of said keys coinciding substantially with the spacing of the linear array of lines of said second indicia;

whereby registration of a note from the disc third indicia with a line of said first indicia at the 12 o'clock position, hereinafter denoted as a base note, provides registration of other notes of the third indicia with other lines of the first indicia, and provides information about the prime chords of the base note from said registration of said base note and registration of notes of said other notes in registration with the 1 and 11 o'clock positions; and

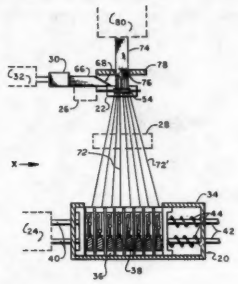
registration of a key of the base note as represented on the keyboard fourth indicia with the first line of said second indicia provides spacial information as to the prime chords of said base note on the keyboard fourth indicia in registration with the first, sixth and eighth lines from the left of said second indicia.

4,881,444

METHOD AND APPARATUS FOR BRAIDING THREE-DIMENSIONAL FABRICS

Konrad L. Krauland, 15542 Toway La., Huntington Beach, Calif. 92647

Filed Jun. 24, 1988, Ser. No. 211,479
Int. Cl.[4] D04C *1/06, 3/00*
U.S. Cl. 87—8 **20 Claims**



1. An apparatus for braiding a fabric comprising:

a. a plurality of braiding elements constructed and arranged to move in preselected paths in a first plane;

b. a plurality of forming elements constructed and arranged to move in preselected paths in a second plane spaced from said first plane, the movement of each of said forming elements corresponding to the movement of one of said braiding elements;

c. fiber supply means for supplying fibers from said braiding elements through said forming elements, whereby movement of said braiding and forming elements braids said fibers into a fabric.

16. A method for braiding a fabric comprising the steps of:

a. providing a plurality of braiding elements movably disposed in a first plane;

b. providing a plurality of forming elements movably disposed in a second plane, each of said forming elements corresponding to one of said braiding elements;

c. supplying fibers from said braiding elements through said forming elements to a forming zone; and

d. moving said braiding and forming elements synchronously in predetermined path to braid said fibers into a fabric.

4,881,445

SHAPED CHARGE

Scott L. Hayes, Mansfield, Tex., assignor to Goex, Inc., Cleburne, Tex.

Filed Sep. 29, 1988, Ser. No. 251,200
Int. Cl.[4] E21B *7/00, 43/117*
U.S. Cl. 89—1.15 **29 Claims**

1. A shaped charge comprising:

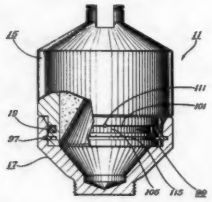
(a) a shaped charge case having first and second ends and a cavity therein, said case cavity opening up to said case first end, said case first end having a first surface that is circumferential, said case second end having means for holding a portion of a detonating cord;

(b) a shaped charge cap having first and second ends and a cavity therein, said cap cavity opening up to said cap first end, said cap first end having a second surface that is circumferential and that is close to said first surface when said case and said cap are assembled together;

(c) said case and said cap being assembled together to form

an enclosed cavity from said case and cap cavities by one of said first ends matingly receiving the other of said first ends such that said first and second surfaces face each other, with a passageway formed by a clearance between said first and second surfaces, said passageway extending between said enclosed cavity and the exterior of said shaped charge, said enclosed cavity being adapted to receive and hold an explosive charge;

(d) circumferential groove means for receiving elastomeric seal means, said groove means being located between said case and said cap when said case and said cap are assembled together, said groove means being formed in at least one of said surfaces such that said passageway extends through said groove means, said groove means substantially surrounding said seal means such that said seal means is confined within said groove means for blocking



said passageway and providing a seal between said case and said cap;

(e) said groove means having spaced apart first and second portions such that said passageway extends from said first portion of said groove means to the exterior of said shaped charge and from said second portion of said groove means to said enclosed cavity;

(f) said first portion of said groove means having gap means sized and located such that when the internal pressure of said enclosed cavity becomes greater than the external pressure of said shaped charge said seal means is unable to close said passageway and the internal pressure vents to the exterior of said shaped charge;

(g) said gap means being blocked from communicating with said enclosed cavity and its internal pressure by said seal means when said seal means is undeformed by internal pressure.

4,881,446

SPACE TRAIN

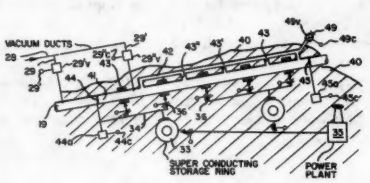
Alvin M. Marks, Bigelow Rd., Athol, Mass. 01331, and Peter H. Diamandis, Box 153, Mit Br P.O., Cambridge, Mass. 02139

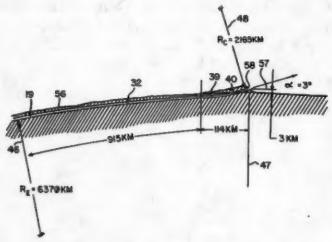
Filed Jul. 28, 1988, Ser. No. 187,246

Int. Cl.[4] B64F *1/04*; F41F *1/02*

U.S. Cl. 89—8 **13 Claims**

1. A system for projecting a Vehicle into space, comprising a Tube having a total length D_T such that 500 km$<D_t<$1500 km, and an inside diameter d of about 5 m, an entrance port and an exit port on said Tube, Airlocks at each of said ports, the axis of said Tube being parallel to to the surface of the earth for a distance D_1, such that 450 km$<D_1<$1250 km, and curving upward with a radius R_c such that 1000 km$<R_c<$3000 km for a distance of D_2 such that 40 km$<D_2<$240 km, the said exit to said Tube being located at a height H such that 1 km$<H<$6 km, and an angle α to the horizontal such that $1°<\alpha<6°$, a Vehicle in said Tube, a first means comprising coils mounted along said Tube, a second means mounted on said Vehicle, an external electric power source, a third means for storing electric energy from said power source, a fourth means along said Tube to supply electric power from said third means to said first means to provide an electromagnetic field travelling along said Tube, said first and second means producing electromagnetic forces which levitate and accelerate said Vehicle, electronic control means, a vacuum pump, ducts and valves connecting said vacuum pump with said Tube and each of said Airlocks, said vacuum pump evacuating said Tube and said Airlocks, each said Airlock comprising at least two doors, electromechanical actuating means on said doors, signals from said control means to said actuating means to control the opening and closing of said doors, said doors opening as the





Vehicle approaches and closing after said Vehicle has passed, said Tube having a residual air pressure due to a partial vacuum in which the aerodynamic drag on the said Vehicle is less than 1% of the drag said Vehicle would encounter at 1 Atmosphere at the same velocity, said Vehicle having such mass and velocity at said exit port to enable its escape from earth into space.

4,881,447

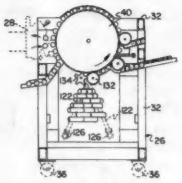
ROUND-ORIENTING REPLENISHER FOR AMMUNITION STORAGE AND TRANSPORT SYSTEM

David P. Yanusko, Pottstown, and Robert Geiger, Jr., Geigertown, both of Pa., assignors to Teleflex Incorporated, King of Prussia, Pa.

Filed May 27, 1988, Ser. No. 200,010

Int. Cl.[4] F41F *9/02*; F42B *39/10, 39/12*

U.S. Cl. 89—34 **20 Claims**



11. An apparatus for orienting and feeding ammunition, comprising:

means defining a feed path for successive individual ones of the rounds, and an inlet to the feed path, the inlet narrowing to an opening leading to the feed path such that loose rounds passing through the inlet to the feed path are oriented in one of two opposite directions;

means for separating individual rounds passing the opening as a function of orientation of the rounds in said opposite

directions, including a starwheel sprocket receiving and carrying the individual rounds around an axis of the starwheel sprocket, the rounds being positioned substantially parallel to the axis of the starwheel sprocket, and at least two guide rails extending around a portion of a circumference of the starwheel sprocket, the guide rails engaging extractor flanges of the rounds, the guide rails diverging from one another axially progressing around said portion of a circumference, whereby the rounds in the two opposite directions are caused to diverge as a function of orientation; and,

two helical feed screws disposed adjacent the guide rails, each of the helical feed screws receiving said rounds from one of the guide rails, the feed screws turning the rounds and the feed screws converging leading to the feed path, whereby the rounds are combined into a succession of rounds oriented in a same direction.

4,881,448

REACTIVE ARMOR ARRANGEMENT

Gunnar Medin; Erik Olsson; Lennart Sjöö , all of Eskilstuna, and Roger Lundgren, Bromma, all of Sweden, assignors to Affarsverket FFV, Eskilstuna, Sweden

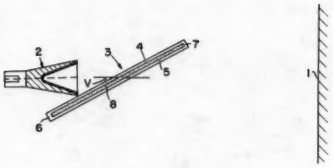
PCT No. PCT/SE87/00131, § 371 Date Nov. 24, 1987, § 102(e) Date Nov. 24, 1987, PCT Pub. No. WO87/05993, PCT Pub. Date Oct. 8, 1987

PCT Filed Mar. 16, 1987, Ser. No. 124,989

Claims priority, application Sweden, Mar. 27, 1986, 8601435

Int. Cl.[4] F41H *5/04*

U.S. Cl. 89—36.02 **5 Claims**



1. A reactive armour arrangement for protection against an obliquely impinging hollow explosive charge jet, comprising

two mutually parallel metal plates which can be penetrated by the jet to form a hole in said two mutually parallel metal plates, and

an interlayer of non-explosive formaldehyde compound located between said two mutually parallel metal plates, said interlayer being an incompressible material and having a density at most ½ of a density of said two mutually parallel metal plates, and a major part of shockwaves generated by the hollow explosive charge jet in said two mutually parallel metal plates being reflected against said interlayer so that reflective forces give rise to forces which strive to move said two mutually parallel metal plates apart, and so that edges of said hole lift in a crater-like fashion therewith forcing material of said two mutually parallel metal plates around said edge of said hole to be shifted progressively into a path of the obliquely impinging hollow explosive charge jet and therewith progressively decreasing energy content thereof.

4,881,449

HYDRAULIC BOOSTER DEVICE

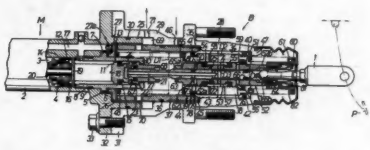
Makota Horiuchi; Atsushi Shimizu, both of Ueda; Yoshitaka Miyakawa, and Kazuya Sakurai, both of Wako, all of Japan, assignors to Nissin Kogyo Kabushiki Kaisha, Ueda and Honda Giken Kogyo Kabushiki Kaisha, Tokyo, both of, Japan

Filed Oct. 25, 1988, Ser. No. 262,366

Claims priority, application Japan, Oct. 26, 1987, 62-270025

Int. Cl.[4] F15B *9/10*

U.S. Cl. 91—372 **7 Claims**



1. A hydraulic booster device, comprising a booster cylinder coupled with a rear end of a cylinder body of a master cylinder, a booster piston slidably received in a piston guide mounted in said booster cylinder and spring-biased in a retreating direction, a valve piston leading to an operating member and slidably received in said booster piston, an output hydraulic pressure chamber defined to face a back of said booster piston, an input hydraulic pressure chamber leading to a hydraulic pressure supply source, an inlet valve interposed between said input and output hydraulic pressure chambers and opened in response to an advancing operation of said valve piston relative to said booster piston, an outlet valve interposed between said output hydraulic pressure chamber and an outlet chamber leading to an oil reservoir and closed in response to an advancing operation of said valve piston relative to said booster piston, and a booster chamber facing a back of an operating piston in said master cylinder and defined between said operating piston and a guide member disposed rearwardly of said operating piston to be able to abut against a leading end of said booster piston, said valve piston having a leading end oil-tightly and movably passed through said guide member to project into said booster chamber, said valve piston being perforated with an oil supply passage which permits communication between said input hydraulic pressure chamber and said booster chamber in response to opening of said inlet valve.

4,881,450

DRIVE CONTROL SYSTEM FOR HYDRAULIC MACHINE

Toichi Hirata, Ushiku; Masakazu Haga; Ichiro Hirami, both of Chiyoda, and Kuniaki Yoshida, Tsuchiura, all of Japan, assignors to Hitachi Construction Machinery Co., Ltd., Tokyo, Japan

Filed Mar. 25, 1988, Ser. No. 173,585

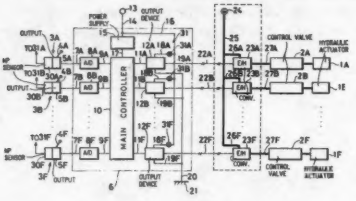
Claims priority, application Japan, Mar. 27, 1987, 62-71761; Jun. 10, 1987, 62-143185; Jul. 15, 1987, 62-174974

Int. Cl.[4] F15B *13/044*

U.S. Cl. 91—459 **23 Claims**

1. A drive control system for a hydraulic machine, including an electric lever device equipped with a manipulation lever and a first output means for generating an electrical manipulation signal corresponding to the degree of each manipulation of the lever, a control valve connected to a hydraulic circuit adapted to actuate a hydraulic actuator, and a control means equipped with a main controller for receiving the manipulation signal and computing a control signal for the control valve on the basis of the manipulation signal and a second output means for generating an electrical actuation signal corresponding to the control signal, characterized in that said system additionally comprises a neutral position sensing means provided with the electric lever device for sensing a neutral position of the manipulation lever and an inhibition means which receives an

output signal from the neutral position sensing means and when the manipulation ever is at the neutral position, inhibits



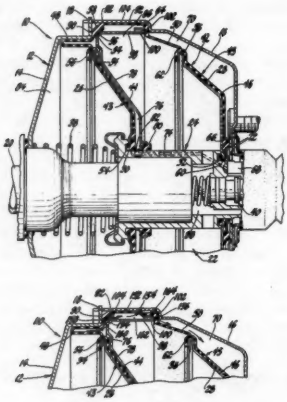
the transmission of a signal between the main controller of the control means and the control valve.

4,881,451

TANDEM VACUUM BOOSTER AND DIAPHRAM FOR SAME

Delvert W. Newhouse, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 3, 1987, Ser. No. 92,634
Int. Cl.[4] F01B *19/00*
U.S. Cl. 92—48 **3 Claims**



1. In a tandem vacuum booster having a booster housing defined by a housing front section and a housing rear section and divided into a front booster section and a rear booster section by a divider wall, an annular front diaphragm support and an annular rear diaphragm support mounted on a movable booster piston at their inner peripheries, diaphragm means dividing said front booster section into a front vacuum chamber and a front variable pressure chamber and said rear booster section into a rear vacuum chamber and a rear variable pressure chamber, first passage means providing continuous fluid communication between said front and rear vacuum chambers, second passage means providing continuous fluid communication between said front and rear variable pressure chambers, and valve means controlling the pressure value in the variable pressure chambers to actuate and release the vacuum booster, said diaphragm means being a single flexible diaphragm member comprising:

a front diaphragm section having a beaded front inner periphery secured to said booster piston adjacent said front diaphragm support, a front supported section in supported relation with said front diaphragm support, a recessed front mounting portion secured to the outer periphery of said front diaphragm support, a front outer peripheral support bead in sealing engagement with said front and rear booster housing sections and said divider wall, and a front roll section extending between said recessed front mounting portion and said outer peripheral support bead and folded into rolling engagement with said booster housing front section;

a rear diaphragm section having a beaded rear inner periphery secured to said booster piston adjacent said rear diaphragm support, a rear supported section in supported relation with said rear diaphragm support, a recessed rear mounting portion secured to the outer periphery of said rear diaphragm support, a rear outer peripheral support bead in sealing engagement with said rear booster housing section and said divider wall, and a rear roll section extending between said recessed rear mounting portion and said rear outer peripheral support bead and foldable into rolling engagement with a portion of said divider wall as said booster is actuated;

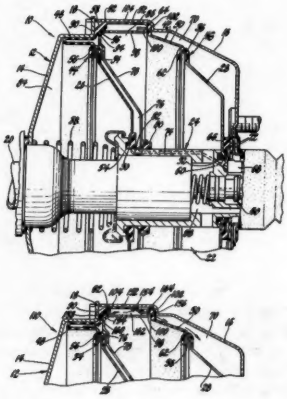
and a circumferentially extending annular connecting section extending between and connecting said front and rear outer peripheral support beads and sealingly engaged with at least a circumferentially extending annular portion of said booster housing rear section radially outward of said divider wall.

4,881,452

TANDEM VACUUM BOOSTER AND DIAPHRAGM FOR SAME

Delbert W. Newhouse, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 3, 1987, Ser. No. 92,642
The portion of the term of this patent subsequent to Nov. 21, 2006, has been disclaimed.
Int. Cl.[4] F01B *19/00*
U.S. Cl. 92—48 **3 Claims**



1. In a tandem vacuum booster having a booster housing defined by a housing front section and a housing rear section and divided into a front booster section and a rear booster section by a divider wall, an annular front diaphragm support and an annular rear diaphragm support mounted on and sealingly secured to a movable booster piston at their inner peripheries for movement therewith, diaphragm means cooperating with said front and rear diaphragm supports and said divider wall and dividing said front booster section into a front vacuum chamber and a front variable pressure chamber and said rear booster section into a rear vacuum chamber and a rear variable pressure chamber, first passage means providing continuous fluid communication between said front and rear vac-

uum chambers, secondn passage means providing continuous fluid communication between said front and rear variable pressure chambers, and valve means controlling the pressure value in the variable pressure chambers to actuate and release the vacuum booster, said diaphragm means comprising a single flexible diaphragm member having:

a front diaphragm section having a recessed front mounting portion with an inner periphery bead sealingly secured to the outer periphery of said annular front diaphragm support, a front outer peripheral support bead in sealing engagement with said front and rear booster housing sections and said divider wall, and a front roll section extending between said front recessed mounting portion and said outer peripheral support bead and folded into rolling engagement with said booster housing front section;

a rear diaphragm section having a recessed rear mounting portion with an inner periphery bead sealingly secured to the outer periphery of said rear diaphragm support, a rear outer peripheral support bead in sealing engagement with said rear booster housing section and said divider wall, and a rear roll section extending between said recessed rear mounting portion and said rear outer peripheral support bead and foldable into rolling engagement with a portion of the divider wall as said booster is actuated;

and a circumferentially extending annular connecting section extending between and connecting said front and rear outer peripheral support beads and sealingly engaged with at least a circumferentially extending annular portion of said booster housing rear section radially outward of said divider wall;

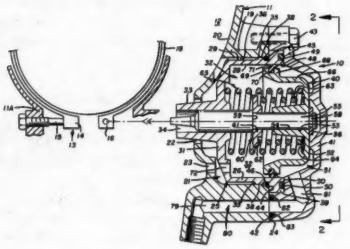
said diaphragm member front and rear diaphragm sections and said front and rear diaphragm supports and said booster piston cooperatively defining a tandem power wall movable piston assembly.

4,881,453

SERVO MECHANISM FOR ACTUATING A FRICTION BAND ASSEMBLY IN A PLANETARY GEAR SET

Douglas C. Armstrong, Novi, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 27, 1988, Ser. No. 211,614
Int. Cl.[4] F16J *1/00*
U.S. Cl. 92—84 **2 Claims**



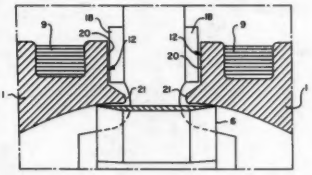
1. A self contained servo for selectively actuating a friction band assembly in a planetary gear set in combination with a transmission case having an interior cavity for receiving a planetary gear set, said servo and transmission case combination comprising: a socket cavity presented from said transmission case; said socket cavity communicating with the interior cavity of said transmission case; a closure face presented from said transmission case and circumscribing said socket cavity; said servo having a housing; locating pilot means presented from the exterior of said housing; said locating pilot means engaging said socket cavity; a piston chamber provided interiorly of said housing; a pilot bore penetrating said housing and being aligned with said piston chamber; an actuating pin slidably received within said pilot bore; piston means slidably received within said piston chamber and operatively secured to said actuating pin; a cover secured to said closure face and operatively engaging said housing to close said piston chamber and to define a pressure chamber against said piston means; and, feed means provided through said cover to effect hydraulic communication with said pressure chamber.

4,881,454

PRESSURE FLUID CYLINDER DEVICE

Bo Granbom, 13 Lostigen, S-731 42 Köping, Sweden

Continuation of Ser. No. 881,716, Jul. 3, 1986, abandoned. This application Aug. 12, 1988, Ser. No. 231,658
Int. Cl.[4] F01B *29/08*
U.S. Cl. 92—88 **1 Claim**



1. A fluid pressure cylinder, comprising: wall means defining an axially extending cylinder having an axial bore having two opposite ends, said wall means including an inner peripheral surface; said cylinder further including two axially-opposite end walls and means for admitting fluid pressure to and relieving fluid pressure from said axial bore near each of said opposite ends;

means defining an axially-extending slot through said cylinder, said slot communicating with said axial bore; said slot including a laterally wider radially outer portion and a laterally narrower radially inner portion, each having two laterally spaced opposite edges;

a flexible band received in said axial bore and extending axially therealong bridging said slot;

means normally urging opposite lateral margins of a radially outer face of said flexible band into sealing engagement with said inner peripheral surface of said cylinder on respectively opposite sides of said slot;

a piston having two axially opposite ends, each including a respective sealing cuff; said piston being axially slidingly received in said axial bore with said sealing cuffs thereof disposed in circumferential sealing engagement, at two respective axially-spaced locations, with a composite of said inner peripheral surface and a radially inner face of said flexible band;

an axially slidable carrier, said carrier having:

a laterally wider portion disposed in said laterally wider portion of said slot and located so as to be accessible from externally of said cylinder,

a laterally narrower portion extending radially inwardly from said laterally wider portion of said carrier, into said axial bore, and

a further portion extending part-way around said flexible band and connecting with said piston at a site located axially between said sealing cuffs, said further portion including means for locally distending said flexible band away from sealingly bridging a radially inner end of said slot, whereby as said carrier and said piston are moved together axially of said cylinder, a site where said flexible band is locally distended correspondingly axially moves along the radially distended correspondingly axially moves along the radially inner end of said slot while remaining located axially between said sealing cuffs of said piston; and

said carrier further includes means located on said laterally wider portion thereof for securing other structure to said

carrier so that said carrier may be used for moving such other structure or such other structure may be used for moving said carrier axially along said slot;

said laterally wider portion of said carrier being laterally wider than said laterally narrower portion of said slot; and said carrier, in said laterally wider portion thereof, including slide means disposed in sliding engagement with both said edges of said laterally wider portion of said slot.

4,881,455

PISTON FOR USE IN A GAS PUMP

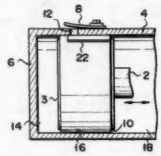
Fuminori Hirose, Tokyo, Japan, assignor to Nitto Kohki Co., Ltd., Tokyo, Japan

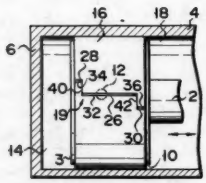
Filed May 27, 1988, Ser. No. 199,759

Claims priority, application Japan, May 30, 1987, 62-84780[U]

Int. Cl.[4] F16J 9/00

U.S. Cl. 92—248 **1 Claim**





1. A piston for use in a gas pump, which is to be slidably inserted in a cylinder having a blocked cylinder head, and a valve hole and an outlet valve located on an outside surface thereof near the cylinder head, said outlet valve being opened when said piston moves in the direction of the cylinder head and approaches the cylinder head, said piston comprising:

a cylindrical piston body having an outer periphery, a distal end portion and a central portion; and

a wear-reducing sheet wound one time around the outer periphery of the piston body,

said wear-reducing sheet being made of a fluorine resin having a small coefficient of friction and a high resistance to heat, and sized to surround substantially the entire outer periphery of said cylindrical piston body, said wear-reducing sheet having a pair of opposing edges;

each of the edges of said wear-reducing sheet being provided with at least one crank-shaped portion, at least two gaps set apart from each other by a predetermined distance in the circumferential direction of the piston body, and at least one no-gap portion being formed between the edges, the no-gap portion extending substantially in the circumferential direction of the piston body to connect the two gaps; and

the first gap located at the distal end portion of the piston body being longer than the second gap located in the central portion thereof in the axial direction of the piston body,

whereby the no-gap portion passes the valve hole and the valve hole is located in the central portion of the piston body when said piston moves in the direction of the cylinder head and approaches the cylinder head, so that air in a pressure chamber defined by the cylinder head and piston head is prevented from leaking by the no-gap portion.

4,881,456

ONBOARD AIR DISCHARGE SYSTEM

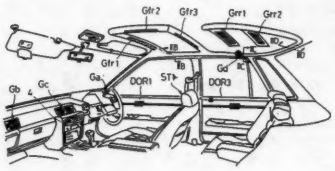
Tomio Yasuda, Kasukabe; Kohji Aoki, and Kazuo Mori, both of Nagoya, all of Japan, assignors to Aisin Seiki Kabushikikaisha, Aichi, Japan

Filed Feb. 29, 1988, Ser. No. 162,104

Claims priority, application Japan, Mar. 5, 1987, 62-50588

Int. Cl.[4] B60H 1/24

U.S. Cl. 98—2.01 **7 Claims**



1. An onboard air discharge system comprising:

two or more seats onboard a vehicle;

a plurality of air ejection ports corresponding to the seats;

air producing means;

an air channel for leading the air produced by the air producing means to each of the ejection ports;

an occupant detecting means for detecting the presence or absence of an occupant on each of the seats including:

a plurality of first electrodes mounted on part of each of the seats as insulated from the respective seats;

a second electrode associated with each of the first electrodes and insulated therefrom and arranged such that at least part of a person present in the seat on which the first electrode is mounted is disposed therebetween;

means for detecting a capacitance between each of the first electrode and the second electrode and providing first electrical signals representing each of the capacitances;

processing means including:

storage means for storing each of the first electrical signals;

storage update means for causing each of the first electrical signals stored in the storage means to be updated at given time intervals;

comparison means for producing second electrical signals representing the occupation of each of the seats whenever a difference between each of the first electrical signals developed by the capacitance detecting means and the signal stored by the storage means which is associated with the first electrical signals exceeds a first threshold value; and

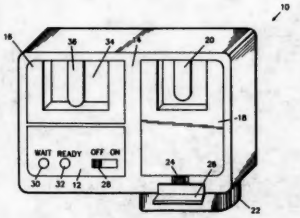
means for setting second threshold values based upon each of the first electrical signals developed during the presence of an occupant and determining the departure of an occupant when each of the first electrical signals decreases below each of the second threshold values which is associated with the first electrical signals; and

means for blocking an air ejection from the air ejection port corresponding to the seat for which the absence of a person has been detected.

4,881,457
LOW-HEADROOM POPCORN POPPER

Thomas M. Lyga, Terryville, and William D. Ryckman, Jr., Orange, both of Conn., assignors to Black & Decker, Inc., Newark, Del.

Filed Nov. 2, 1987, Ser. No. 115,846
Int. Cl.[4] A23L *1/18*
U.S. Cl. 99—323.5 18 Claims

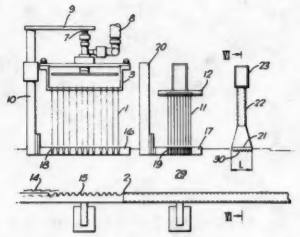


1. An air popper for popping popcorn comprising:
a blower;
a plenum;
air conditioning means for conducting air from said blower to said plenum;
a popping chamber in said plenum;
air admitting means for admitting air from said plenum into said popping chamber;
air heating means disposed about a circumference of said popping chamber, said air heating means for heating air in at least one of said air conducting means and said plenum; and
said blower, said plenum and said air conducting means being horizontally disposed with respect to each other, whereby vertical height of said air popper is minimized.

4,881,458
METHOD OF AND APPARATUS FOR DISPERSING AND DISTRIBUTING A PICKLE IN RAW MEAT

Tsuyoshi Higashimoto, Ikoma, Japan, assignor to Higashimoto Kikai Co., Ltd., Japan

Filed Feb. 29, 1988, Ser. No. 161,903
Claims priority, application Japan, Mar. 5, 1987, 62-51084; Mar. 5, 1987, 62-51085
Int. Cl.[4] A23B *4/00*
U.S. Cl. 99—533 7 Claims

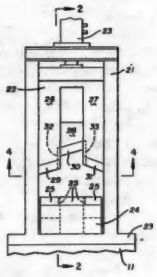


1. An apparatus for distributing and dispersing a pickle solution throughout raw meat, comprising:
(a) a conveyor operative for intermittantly feeding along a feed direction successive masses of raw meat containing a pickle solution, said conveyor having opposite sides spaced apart along a transverse direction that extends generally normally of the feed direction;
(b) a pair of guide walls at, and extending upwardly of, the opposite sides of the conveyor, said guide walls being spaced apart along the transverse direction by a predetermined distance and bounding with the conveyor a channel in and along which the successive raw meat masses containing the pickle solution are confined and guided;
(c) a movable press block having a transverse width dimension corresponding to said predetermined distance and situated above the conveyor for reciprocal movement toward and away from the conveyor and into and out of the channel, said press block having a rectangular bottom surface formed with a number of projections, said projections being in the form of pyramids arranged in a lattice pattern on the entire bottom surface of said press block, said projections being adapted to bite into said raw meat masses to resist slippage occurring between the bottom surface of said press block and said raw meat masses; and
(d) drive means for reciprocally moving the press block between a remote position in which the press block is disposed remotely from the raw meat masses in the channel, and a pressing position in which the press block enters the channel and compresses the raw meat masses confined in the channel between the guide walls to forcibly disperse and uniformly distribute the pickle solution throughout the raw meat masses.

4,881,459
HYDRAULIC SCRAP SHEAR

John R. Ramun, Youngstown, Ohio, assignor to Allied Gator, Inc., Youngstown, Ohio

Filed Mar. 17, 1988, Ser. No. 169,277
Int. Cl.[4] B30B *9/32, 15/06;* B26B *5/12*
U.S. Cl. 100—95 6 Claims



1. A hydraulic scrap shear for compaction and multiple segmentation in sequence shearing of scrap fed into the shear in a scrap feed direction into uniform scrap blocks, which comprises: a support and guide frame, a shearing block within said frame, a shear member within said frame registerable with said shear block and moving in an essentially linear direction in a vertical plane, shear block shear blades positioned on said shear block in right angular and co-planar relation to one another, said shear block shear blades including a central blade extending transverse to the scrap feed direction, side blades connectd to opposite ends of said central blade and extending in the scrap feed direction and outer side blades connected to ends of said side blades that are remote from said central blade and which extend transverse to the scrap feed direction, means for moving said shear member within said support frame, multiple interconnected shear member blades positioned on said shear member, said shear member blades including a first blade extending transversely of the scrap feed direction, second and third blades connected to ends of said first blade and extending in the scrap feed direction and fourth and fifth blades connected to ends of said second and third blades that are remote from said first blade and which extend transversely of

the scrap feed direction, each of said shear member blades being positioned angularly in relation to said co-planar shear block blades on said shear block and at right angles to each other, said blades being engageable on an elongated scrap section as said scrap section is intermittently advanced into said scrap shear, means for supporting and advancing said scrap section, each of said blades on said shear member being positioned at a different relative height to said registrable shear blades on said shear block, means on said shear member conforming to said angular position of said blades.

4,881,460

POSTAGE METER AND CONTROL ARRANGEMENT FOR SAME

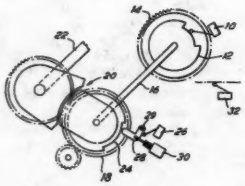
Ray L. Bannister, Richmond; Frederick C. Close, Great Amwell, and Peter J. Coeber, Earith, all of United Kingdom, assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Aug. 26, 1987, Ser. No. 89,720

Claims priority, application European Pat. Off., Aug. 27, 1986, 86306619

Int. Cl.[4] B41L *39/00*

U.S. Cl. 101—91 **7 Claims**



1. A postage meter having printing means for envelopes and comprising:

a motor drive connected to said printing means for operating same, said motor drive requiring a predetermined amount of movement in order to cause said printing means to carry out a single printing operation, and

means connected to said motor drive for preventing a second printing operation from being carried out until a current envelope is fully discharged from the meter and the next envelope introduced;

said preventing means comprising:

control means connected to said motor drive for activating same while a current envelope is present in said postage meter,

said control means including electrical circuit means operable upon operation of the motor drive during a printing operation to prevent a second printing operation until the drive means has completed the current printing operation and the current envelope has been fully discharged;

said electrical circuit means comprising first and second parallel current paths for activating said motor drive, and means for establishing and interrupting said first and second current paths in response to different states of said postage meter.

4,881,461

MAILING MACHINE INCLUDING IMPROVED DRIVING MEANS CIRCUIT

John R. Nobile, Fairfield, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Feb. 8, 1989, Ser. No. 307,803

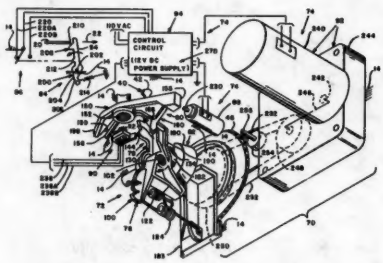
Int. Cl.[4] B41F *13/24*

U.S. Cl. 101—235 **10 Claims**

1. In a mailing machine including a postage meter and means for feeding a sheet through and from the machine, wherein the postage meter includes rotary printing means for printing indicia on a sheet fed through the machine, and the machine includes means for driving the printing means, wherein the driving means includes a drive gear for rotating the printing means, the driving means includes a shutter bar movable into and out of locking engagement with the drive gear, the driving means includes an actuating member for moving the shutter bar, and wherein the machine includes trip means for sensing a sheet, an improvement comprising:

a. a source of supply of d.c. power;

b. circuit means for controlling the driving means, the circuit means including a trip switch actuatable in response to the trip means sensing a sheet fed to the machine;



c. the driving means responsive to actuation of the trip switch for causing the actuating member to move the shutter bar out of locking engagement with the drive gear and then causing the drive gear to rotate; and

d. the circuit means including means for disabling the trip switch for a predetermined time period after the driving means commences rotating the drive gear.

4,881,462

PORTABLE ELECTRICAL LABELLING MACHINE

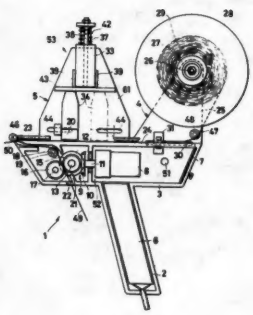
Carlo Vanoni, Varese, Italy, assignor to Mida S.r.l., Varese, Italy

Filed Mar. 10, 1988, Ser. No. 166,239

Claims priority, application Italy, Mar. 17, 1987, 21146 B/87

Int. Cl.[4] B41F *1/02*

U.S. Cl. 101—292 **15 Claims**



1. A portable electrical labelling machine for applying labels carried by a tape to an object, comprising:

a body having a tape path therein and a handle portion attached thereto;

a tape holder coupled to said body for carrying a roll of said label-carrying tape, said tape comprising a continuous band of paper transparent to infra-red light and which supports the labels in spaced relationship so that a gap of transparent paper is between the spaced labels;

photocell detection means coupled to said body in the tape path for emitting and receiving infra-red light across the

tape path and being responsive to produce an enabling output in the absence of received light resulting from the presence of a label therein and being responsive to produce a disabling output in response to received infra-red light passing through the transparent tape in the gap between the labels;

a printing device responsively coupled to said photocell detection means, for printing a label upon the occurrence of said enabling output; and

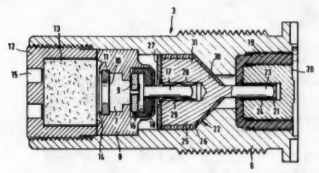
drive means responsively coupled to said photocell detection means for pulling said tape upon the occurrence of said enabling output such that said tape is unwound from said holder means and the label is withdrawn from said photocell detection means, said drive means being disabled in response to the occurrence of the disabling output to stop the tape.

4,881,463

ELECTRIC IGNITER ASSEMBLY

Jacob Ninio, Tel-Aviv; Jacob Baratz, Kfar Saba, and Haim Moshe, Hod Hasharon, all of Israel, assignors to The State of Israel, Ministry of Defence, Israel Military Industries, Israel, Israel

Filed Apr. 26, 1988, Ser. No. 186,451
Claims priority, application Israel, Feb. 24, 1988, 85527
The portion of the term of this patent subsequent to Sep. 20, 2005, has been disclaimed.
Int. Cl.[4] F42B *3/18*; F42C *19/12*
U.S. Cl. 102—202.2 **4 Claims**



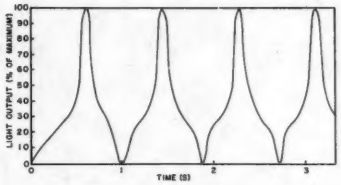
1. An electric igniter assembly of the kind that comprises a body holding an initiator charge and in association therewith an electric ignition element comprising an insulating carrier member bearing two electric conductors insulated from each other and interconnected by an electric resistor bridge, one of which conductors is permanently electrically linked with one of two terminals of a DC source while the other is electrically linked to a contactor connectable at will to the other of said terminals, the improvement by which said contactor comprises an aluminium body having part of its surface covered by an aluminium oxide coating that serves as electric insulator, and further characterized by the provision of an intermediary electric conductor member designed as a radio frequency (RF) filter and comprising a pin electrically linked to said contactor and a block enclosed within an insulating sheath and electrically linked to said electric ignition element, which block comprises a conical portion adjacent to said pin tightly fitting onto a correspondingly shaped seat in said body thereby being designed as a stopper preventing any backflowing combustion gases or materials from reaching the base portion of the igniter assembly.

4,881,464

SIGNAL OR RESCUE FLARE OF VARIABLE LUMINOSITY

David C. Sayles, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 6, 1989, Ser. No. 319,581
Int. Cl.[4] B41K *1/48*; C06B *45/10*
U.S. Cl. 102—336 **9 Claims**



1. A composition of matter, consisting essentially of:

a. about 36 to 44 percent by weight of an octafluorohexanediol compound;

b. about 21 to 27 percent by weight of a metal selected from the group consisting of magnesium and aluminum;

c. about 16 to 21 percent by weight of a chlorinated benzene compound;

d. about 14 to 18 percent by weight of an inorganic oxidizer; and

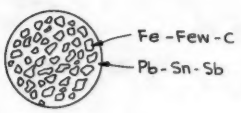
e. about 1 to 3 percent by weight of an polyisocyanate compound.

4,881,465

NON-TOXIC SHOT PELLETS FOR SHOTGUNS AND METHOD

Robert C. Hooper, 16209 Congo La., Houston, Tex. 77040, and Franz R. Brotzen, 2701 H Bellefontaine, Houston, Tex. 77025

Filed Sep. 1, 1988, Ser. No. 239,310
Int. Cl.[4] F42B *5/24*
U.S. Cl. 102—501 **14 Claims**



1. A non-toxic shotgun pellet comprising the following components:

a first alloy containing primarily a ferrotungsten alloy;

a second alloy containing primarily lead;

wherein said first alloy is in the form of particles suspended in a matrix of said second alloy;

wherein the concentration of lead in said pellet is no greater than forty percent by weight; and

wherein the specific gravity of said pellet is at least 9.5 grams per cubic centimeter.

4,881,466

HIGH VELOCITY SABOT FOR SPIN STABILIZED PENETRATOR

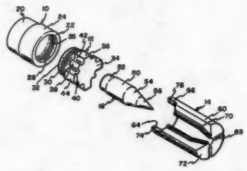
Jeremiah E. McGinley, Essex Junction, Vt., assignor to General Electric Company, Burlington, Vt.

Filed Dec. 23, 1988, Ser. No. 288,939
Int. Cl.[4] F42B *13/16*
U.S. Cl. 102—522 **4 Claims**

1. A sabot assembly, for launching a spin stabilized subcaliber projectile, from the bore of a gun barrel, comprising:

a one-piece-has sabot having

a longitudinal axis;
a center, longitudinally extending bore for receiving the projectile;
a plurality of more than two longitudinally and radially extending slots, for, upon rupture, dividing the sabot into a like plurality of petals, each slot terminating in and centered on a respective notch,
each pair of immediately adjacent notches defining a respective sabot lug;
a base having



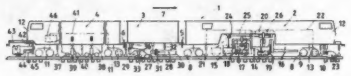
a cylindrical body having a rotating band, and
a like plurality of lugs, each lug interfitted within a respective sabot notch;
each pair of immediately adjacent lugs defining a respective notch in said body, which is interfitted with a respective sabot lug;
each interfitted base lug and sabot notch having a sole torque transmitting interface which is a flat plane extending longitudinally and chordally.

4,881,467

CONTINUOUSLY ADVANCING TRACK MAINTENANCE OR REHABILITATION MACHINE

Josef Theurer, Vienna, Austria, assignor to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H., Vienna, Austria

Filed May 20, 1988, Ser. No. 196,285
Claims priority, application Austria, Sep. 4, 1987, 2237/87
Int. Cl.[4] E01B *27/17*
U.S. Cl. 104—7.2 **10 Claims**



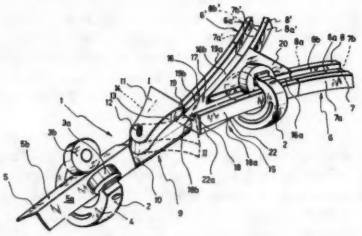
1. A machine continuously advancing in an operating direction for maintaining or rehabilitating a railroad track consisting of two rails fastened to successive ties resting on ballast, which comprises:
(a) a first machine frame supported on two undercarriages for continuous movement in the operating direction, the undercarriages being spaced apart in said direction and the machine frame having a front end and a rear end with respect to said direction,
(b) a carrier frame arranged between the undercarriages,
(c) a track lifting and lining unit vertically adjustably mounted on the carrier frame,
(d) a ballast tamping unit vertically adjustably mounted on the carrier frame, the ballast tamping unit comprising
(a) pairs of reciprocatory and vibratory tamping tools immersible in the ballast upon vertical adjustment of the ballast tamping unit for tamping ballast under respective ones of said ties,
(e) a drive linking the carrier frame to the first machine frame for longitudinally displacing the carrier frame with respect thereto,
(f) a second machine frame supported on two undercarriages, the undercarriages being spaced apart in said direction and the second machine frame having a front end and a rear end with respect to said direction,
(g) a coupling linking the second machine frame front end to the rear end of the first machine frame,
(h) a plow arrangement vertically adjustably mounted on the second machine frame between the undercarriages thereof, the plow arrangement comprising
(1) drive means connecting the plow arrangement to the second machine frame for vertically adjusting the plow arrangement with respect thereto,
(2) a center plow for plowing ballast between the rails of the track,
(3) shoulder plows for plowing ballast laterally adjacent each one of the rails, and
(4) drive means for operating each one of the plows,
(i) a third machine frame supported on two undercarriages, the undercarriages being spaced apart in said direction and the third machine frame having a front end and a rear end with respect to said direction,
(j) a coupling linking the third machine frame front end to the rear end of the second machine frame, and
(k) a track stabilization unit vertically adjustably mounted on the third machine frame between the undercarriages thereof, the track stabilization unit comprising
(1) drive means connecting the track stabilization unit to the third machine frame for vertically adjusting the track stabilization unit with respect thereto,
(2) track stabilizing tools engaging the rails, and
(3) vibratory drive means connected to the track stabilizing tools for vibrating the same,
(l) the front end of the second machine frame being supported on a rear one of the undercarriages supporting the first machine frame at the rear end thereof and the rear end of the second machine frame being supported on a front one of the undercarriages supporting the third machine frame at the front end thereof, said rear undercarriage of the first machine frame and a front undercarriage of the third machine frame at the front end thereof constituting the two undercarriages supporting the second machine frame.

4,881,468

SUSPENSION CONVEYOR SYSTEM

Josef Hafner, Gröbenzell; Werner Bergmeier, Munich; Rolf Schönenberger, Landsberg, and Matthias Fischer, Ismaning, all of Fed. Rep. of Germany, assignors to Veit GmbH & Co., Landsberg, Fed. Rep. of Germany

Filed Feb. 10, 1987, Ser. No. 13,254
Claims priority, application Fed. Rep. of Germany, Feb. 19, 1986, 3605317; Nov. 3, 1986, 3637287
Int. Cl.[4] B61B *3/00*
U.S. Cl. 104—103 **66 Claims**



62. Conveyance unit for traveling along a rail of a suspension conveyor system comprising a first and a second travelling roller connected to one another by an open yoke, and a suspension apparatus for objects to be conveyed connected to said yoke for travelling therewith, said objects being in a hanging

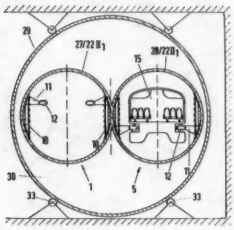
position with their centers of mass below said rail, means mounting said yoke to said suspension apparatus for tilting and rotational movement relative thereto and about an axis substantially parallel to said rail, said suspension apparatus being supported by said mounting means so as to maintain said hanging position of said object during tilting and rotation of said yoke.

4,881,469

OPERATING SYSTEM FOR HIGH SPEED TUNNEL TRAINS

Helmut Hirtz, Alemannenstrase 7, 1000 Berlin 28, Fed. Rep. of Germany

Filed Jun. 29, 1987, Ser. No. 86,298
Int. Cl.[4] B61B *13/10*
U.S. Cl. 104—138.1 **16 Claims**



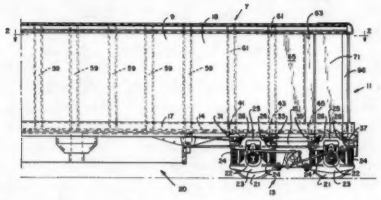
5. Operating system of claim 4, characterized by that in the region (A-C) of the intersection, the toroid (21) of the branch tunnel (5), exhibits in the wall section adjacent the directional tunnel (1) sector-shaped cutouts (23), that cylinder walls (24) of rotational cylinder segments (25 IV_{1-n}; $25V_{1-n}$; $25VII_{1-n}$) extend into those sector-shaped cutouts (23) with a snug fit, that each cylinder wall (24) exhibits a convex, retracted, cylindrical section (26), whose radius of curvature is equal to the inner radius of the toroid (21), that from this convex, retracted, cylindrical section (26), a drive rail (12) extends outwardly, and that in each rotational cylinder segment ($25V_n$), at an angular distance of 180° from the convex, retracted, cylindrical section (26), a switch segment (22) of the directional tunnel (1) is mounted.

4,881,470

GONDOLA CAR HAVING FRAMELESS RADIAL TRUCK

Donald B. Yates, Birmingham, Ala., and Phillip G. Przbylinski, Shererville, Ind., assignors to Trinity Industries, Inc., Dallas, Tex.

Filed May 7, 1987, Ser. No. 47,979
Int. Cl.[4] B61F *5/38*
U.S. Cl. 105—165 **9 Claims**



1. A railway car comprising:

a truck including a first laterally extending axle having a first pair of wheels supported thereon for rolling support on a pair of rails; said truck having first and second longitudinally spaced pairs of laterally spaced support means thereon; a car body having an end structure supported on the truck; said end structure including:

a bottom closure member having an upper surface and a lower surface;

a center sill connected with the bottom closure member;

receiving means on the lower surface of the bottom closure member and engaging said support means for supporting said car body on the truck;

first and second laterally extending longitudinally spaced truck support members fixedly connected with the the upper surface of the bottom closure member, each of said truck support members being substantially vertically above a respective pair of support means for reinforcing the bottom closure member to support the car body on the truck;

said truck having a second laterally extending axle thereon spaced longitudinally from the first axle and having a second pair of wheels thereon,

said truck having a third pair of laterally spaced support means spaced longitudinally outward from said first and second pairs of support means; and

said receiving means engaging said third pair of support means for supporting said car body thereon;

a third truck support member fixedly connected with the upper surface of the bottom closure member, said third truck support member being substantially vertically above the third pair of support members for reinforcing the bottom closure member to support the car body on the truck;

said truck having a fourth pair of laterally spaced support means spaced longitudinally outward from the first, second, and third pairs of support means,

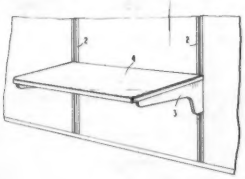
said receiving means including a pair of laterally spaced engagement means each engaging respective support means of the fourth pair of support means.

4,881,471

VERTICALLY ADJUSTABLE, RETROFITTABLE WORKSTATION

Edward M. Schwartz, Kansas City; Robert E. Morgan, Grain Valley, and Wilburn D. Everman, Belton, all of Mo., assignors to Edtech Company, Mo.

Filed Nov. 8, 1988, Ser. No. 268,415
Int. Cl.[4] A47B *9/12*
U.S. Cl. 108—144 **7 Claims**



1. A vertically adjustable, work station adapted to be mounted to a wall panel, comprising:

(a) a pair of horizontally spaced, vertically oriented support rails secured to said panel;

(b) a work surface;

(c) a pair of support brackets for supporting said work surface;

(d) a first pair of elongate, vertically oriented, rails horizontally displaced from one another and adapted to be individually and stationarily mounted to the support rails;

(e) a second pair of elongate, vertically oriented, rails individually slidably mounted to said first pair of rails;

(f) means for individually mounting said support brackets and thus said work surface to said second pair of rails;

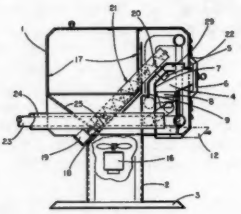
(g) a first elongate, horizontally oriented, channel member interconnecting said first pair of rails;
(h) a second elongate, horizontally oriented, channel members interconnecting said second pair of rails; and
(i) drive means coupled between said first and second channel members for selectively displacing said channel members towards or away from each other to attendantly vertically displace the work surface.

4,881,472

IGNITION SYSTEM AND CONTROL MEANS FOR PELLETIZED-FUEL FURNACE

Thomas Stromberger; Douglas Freeland, both of Spokane, Wash., and Dwain Freeland, Spirit Lake, Id., assignors to Deeze, Inc., Spokane, Wash.

Filed Oct. 20, 1988, Ser. No. 260,446
Int. Cl.[4] F23N *5/18*
U.S. Cl. 110—186 **5 Claims**



1. An electrical-arc ignition system which automatically ignites and automatically controls the operation of a furnace system having a fuel feed means and which burns fragmented and pelletized wood-type fuel, and which comprises:
an electrical-arc ignition means responsive to a thermostat means, including a fire pot which contains the fuel during ignition and combustion, and two electrode means configured relative to said fire pot and separated from each other by an air gap such that, when energized, an electrical-arc will occur between the two electrodes and said electrical-arc will be in a location relative to the bottom containment surface of the fire pot to contact and ignite the fuel;
said fire pot being made from material which is non-conductive, refractory material, comprising four internally sloped side-walls and a bottom surface which contains air passageways through which combustion air may be drawn;
a system control means which energizes for purposes of ignition in response to a thermostat means, and which de-energizes the electrical-arc ignition means after a predetermined time interval of sufficient duration to ignite the selected fuel.

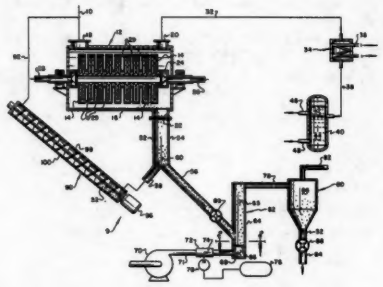
4,881,473

METHOD AND APPARATUS FOR TREATING OIL-WATER-SOLIDS SLUDGES AND REFINERY WASTE STREAMS

James L. Skinner, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Division of Ser. No. 796,349, Nov. 8, 1985, Pat. No. 4,839,022, which is a continuation-in-part of Ser. No. 677,658, Dec. 3, 1984, abandoned. This application Jan. 30, 1989, Ser. No. 303,324
Int. Cl.[4] F23J *3/00*
U.S. Cl. 110—244 **14 Claims**

1. A system for treating sludge such as refinery waste streams, oil storage tank sludges and marine tanker ballast water to distill low boiling temperature liquids, oxidize heavy hydrocarbon substances and oxidize heavy metal solids contained in said sludge for reduction of said sludge to recovered liquids, oxidized hydrocarbons, and oxides of heavy metals which are substantially water insoluble, said system comprising:
dryer means for receiving a flow stream of said sludge, said dryer means being operable to conduct said sludge therethrough and to vaporize liquids in said sludge which are boilable at temperatures in the range of 700° F. or less, said dryer being operable to discharge substantially dried solid particles therefrom;
a combustor/oxidizer in communication with said dryer for receiving said dried solid particles;



means for supplying an oxygen containing gaseous flow stream to said combustor/oxidizer for oxidizing hydrocarbons in said combustor/oxidizer and for reducing heavy metals in said solid particles to oxides which are substantially water insoluble;
means for discharging oxidized solid particles from said combustor/oxidizer; and
means for separating said gaseous flow stream from said oxidized solid particles for disposal.

4,881,474

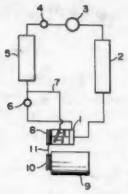
PULVERIZED COAL COMBUSTION APPARATUS

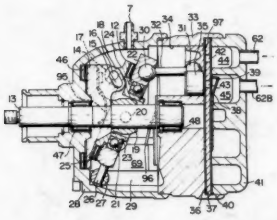
Osamu Okada, Kure; Shigeki Morita, Hiroshima; Shigeto Nakashita, Kure; Tadahisa Masai, Ageo; Shigeru Tominaga, Hiroshima, and Hiroshi Inada, Kure, all of Japan, assignors to Babcock-Hitachi Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 5, 1988, Ser. No. 253,675
Claims priority, application Japan, Oct. 7, 1987, 62-251537; Jun. 30, 1988, 63-160704
Int. Cl.[4] F23D *1/02*
U.S. Cl. 110—263 **3 Claims**

1. A pulverized coal combustion apparatus comprising a burner through which pulverized coal and carrier medium are passed to be burnt in a combustion chamber, and a flame retainer disposed at an end of said burner, said flame retainer including a flared tube and an annular plate, which plate has a plurality of radially inwardly projecting parts equiangularly spaced from each other, wherein said annular plate comprises a plurality of ceramic pieces and a plurality of fastener elements, both of which are arranged and assembled alternately to form said annular plate, said ceramic piece being so shaped that is projects radially inwardly to serve as said projecting part when assembled, and said ceramic piece having at opposite

sides thereof smoothly curved edge surfaces, and said fastener element having at opposite sides thereof smoothly curved edge





surfaces which are engaged with the curved edge surfaces of neighboring two ceramic pieces of said ceramic pieces.

4,881,475

METHOD FOR CLEANING UP CONTAMINATED SOIL

Laurens C. De Leur, Rijnsburg, Netherlands, assignor to B.V. Aannemingsbedriof N.B.M., The Hague, Netherlands

Filed Mar. 24, 1988, Ser. No. 172,373

Claims priority, application Netherlands, Mar. 27, 1987, 8700726

Int. Cl.[4] F23G *5/00*

U.S. Cl. 110—346 **6 Claims**

1. Method for cleaning up contaminated soil by means of indirect heating of the soil in a rotating furnace which is sealed with respect to the environment, contaminants released from the soil in said rotating furnace being subsequently combusted in a second furnace at an appreciably higher temperature than the wall temperature of said rotating furnace, the method comprising:

maintaining said wall temperature of said rotating furnace above the spontaneous combustion temperature of pyrolysis products which are released from the soil and maintaining said wall temperature sufficiently high to react hydrocarbons released as said pyrolysis products form the soil in said rotating furnace with any oxygen present in said rotating furnace and thereby remove said oxygen from said rotating furnace.

4,881,476

CYCLONE REACTOR WITH INTERNAL SEPARATION AND AXIAL RECIRCULATION

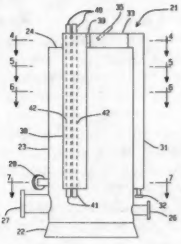
Frederick E. Becker, Reading, and Leo A. Smolensky, Concord, both of Mass., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 26, 1988, Ser. No. 224,413

Int. Cl.[4] F23D *1/04*

U.S. Cl. 110—347 **49 Claims**

1. A chemical reaction vessel, suitable for use as a combustor for burning fine coal particles, which comprises in combination, a reaction chamber having a circular inlet end wall containing a central circular first fluid inlet opening; a circular discharge end wall containing a central circular first fluid outlet opening; a cylindrical reaction chamber wall therebetween containing a tangential second fluid inlet opening proximate said circular inlet end wall and a tangential second fluid



outlet opening proximate said circular discharge end wall; and, a cylindrical inlet chamber contiguous with and attached to said reaction chamber, said inlet chamber having a cylindrical inlet chamber wall attached to said reaction chamber circular inlet end wall coincident with and encompassing said central first fluid inlet opening.

4,881,477

METHOD AND APPARATUS FOR THE AUTOMATIC TRANSFER OF PANTYHOSE AND SIMILAR ARTICLES FROM A TOE SEWING MACHINE TO A DRAWING MACHINE

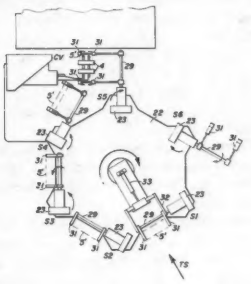
Vinico Gazzarini, Impruneta, Italy, assignor to Solis S.r.l., Firenze, Italy

Filed Jul. 14, 1988, Ser. No. 219,285

Claims priority, application Italy, Jul. 14, 1987, 9434 A/87

Int. Cl.[4] D05B *21/00*

U.S. Cl. 112—121.15 **9 Claims**



1. A machine for the automatic transfer of pantyhose of similar articles from a toe sewing machine (T) having a standing surface to a drawing machine comprising:

a first section (A) in correspondence to an unloading station (TS) of a toe sewing machine (T) and comprising a sewing machine having a plurality of overturning tubes comprising a driven carriage arrangement, a horizontal track located above said tubes, means connected to said carriage for driving it in a straight reciprocating motion on said horizontal track above said overturning tubes (1) of the toe sewing machine (T), an arm on the toe sewing machine with two grippers (13) on said arm for clamping the elastic edge (5') of the pantyhose (5) supported by said tubes (1) at points of maximum horizontal spacing in order to carry said elastic edge (5') outside of the toe sewing

machine (T) and overturn means for applying a pneumatic suction on the pantyhose legs (5'') within said overturning tubes and allowing the whole pantyhose to be overturned;

a second section interposed between the unloading station of the toe sewing machine (T) and the loading station (CV) of the drawing machine (W) and comprising:

a bench with a horizontal table intermittently rotating about its own vertical axis and performing a dwell at six operative stations, on which an equal number of supports are mounted each of which with a corresponding horizontal arm carrying two pairs of beaks which are vertically stretchable apart in order to seize the elastic edge on the pantyhose from said pair of grippers of said first section and to then stretch it open in the form of a rectangle while leaving the pantyhose hanging down, said arm and said support having rotation means so that said arm and said support are able to rotate about their own axis in order to first arrange said elastic edge of the thus stretched pantyhose in horizontal position and above tips of shapes (4) of the drawing machine (W), and with the longitudinal seams of pantyhose resulting in a vertical plane intermediate to said shapes and, subsequently, take up again the initial position of the table first station;

a third section in correspondence of a drawing machine and comprising:

a carriage driven by a vertical alternate motion and provided with two horizontal arms with right-angle bent and facing ends which allow, during the downwards travel of carriage, the introduction of said ends through the opening of the pantyhose and the withdrawal of the elastic edge (5') from the beaks of an arm of said second section and, during the successive upwards travel of the carriage, the fitting of the pantyhose legs over the shapes of the drawing machine.

9. A machine for the transfer of pantyhose or like garments from a toe sewing machine to a drawing machine comprising:

a track;

a carriage riding on said track;

a plurality of gripper means connected to said carriage, for grabbing an elastic edge of pantyhose from an unloading area of said toe sewing machine and for transferring the pantyhose outside the toe sewing machine with horizontal motion while keeping said elastic edge of said pantyhose in a vertical plane;

a bench with rotatable table means for stopping intermittently at a plurality of stations;

support means positioned at each station, said support means having a vertical axis for rotation of substantially 120° about said vertical axis,

a horizontal arm on each support means connected to two spaced apart posts, one end of each post connected to the arm, the other end being free, said horizontal arm being rotatable on its axis;

beak means connected to each said free end, said beak means being synchronized with the sewing machine for picking up the pantyhose from said gripper means by stretching apart the elastic edge of said pantyhose to form a rectangle;

linkage means, connected to a program actuated pneumatic cylinder overhanging said table and fixed to said bench for operating closing of the beak means when in correspondence to the unloading station of the toe sewing machine;

said horizontal arm and said support means positioning said pantyhose edge in a horizontal position, as said pantyhose rotates towards the drawing machine;

the drawing machine having a corresponding fixed structure, a carriage means that rides vertically on said fixed structure, said carriage means provided with parallel horizontal arms and means to allow the parallel arms to move together and apart, said parallel arms being at a higher position than said pantyhose as said pantyhose comes into alignment to the drawing machine, said carriage means moving downward until said parallel arms are within said elastic edge of said pantyhose, said parallel arms then moving apart to spread apart said elastic edge and remove said edge from said beak means,

said carriage means and said pantyhose subsequently moving upward to contact shapes of the drawing machine, extracting means releasing said parallel arms of said carriage from said pantyhose.

4,881,478

DEVICE FOR ATTACHING ELECTRONIC CIRCUIT PLATE OF COMPUTER-OPERATED SEWING MACHINE

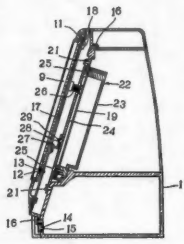
Yasuro Sano, Tokyo, Japan, assignor to Janome Sewing Machine, Tokyo, Japan

Filed Apr. 22, 1988, Ser. No. 183,625

Claims priority, application Japan, Apr. 24, 1987, 62-99695

Int. Cl.[4] D05B *3/02*

U.S. Cl. 112—259 **2 Claims**



1. In a computer-operated sewing machine having a standard machine frame which includes an arm and a bed, a needle bar which is supported in the machine frame and which performs vertical and horizontal reciprocal movements, a loop taker which is rotatably supported on the machine frame and which interlinks upper and lower threads in association with a needle fixed to the needle bar, a drive motor which moves the loop taker and the needle bar, stepping motors which control the movements of the needle bar and fabric feed, and a computer control portion which delivers control data to the stepping motors, a device for attaching electronic plates of different models of the computer-operated sewing machine, comprising a circuit plate case which holds a control circuit plate for said drive motor and which is fixed to said machine frame, an operational panel which holds an operating keyboard for an operator and a control circuit plate for said computer control portion and which is fixed to said machine frame, and coded keying means composed of pins and holes positioned for each model of the sewing machine and provided between said operation panel and said machine frame and between said operation panel and said circuit plate case.

4,881,479

METHOD OF TRANSVERSELY SUBDIVIDING AN ELONGATED FLEXIBLE WEB

Johannes Freermann, Ochtrup, Fed. Rep. of Germany, assignor to Carl Schmale GmbH & Co. KG, Ochtrup, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 76,593, Jul. 23, 1987, abandoned. This application Jun. 17, 1988, Ser. No. 210,149

Claims priority, application Fed. Rep. of Germany, Jul. 24, 1986, 3624994

Int. Cl.[4] D05B *1/00, 27/00*

U.S. Cl. 112—262.3 **4 Claims**

1. A method of cutting pieces from an elongated flexible web and delivering the pieces to a treatment machine, the method comprising the steps of sequentially:

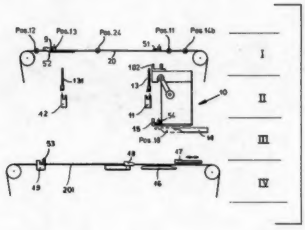
(a) feeding a leading edge of the web to a cutting station downstream in a longitudinal direction with the edge extending transversely and affixing the leading edge at the

cutting station to a first one of a plurality of transversely extending circulating needle bars;

(b) advancing the first needle bar longitudinally downstream away from the cutting station to a holding station spaced downstream from the cutting station and arresting the first needle bar in the holding station;

(c) at the cutting station affixing to the web a second one of the transversely extending circulating needle bars and, closely but spacedly downstream therefrom, a noncirculating needle bar;

(d) while maintaining the first and second circulating bars and the noncirculating needle bar substantially stationary, cutting the web transversely between the second circulating bar and the noncirculating bar and thereby cutting a piece from the web, the piece being spanned between a trailing edge at the noncirculating bar and a leading edge at the first circulating needle bar;



(e) dropping the noncirculating and first circulating needle bars with the web piece spanned between them and thereby transferring the piece to a conveyor extending transversely from between the stations to the treatment machine for conveyance of the piece away on the conveyor toward the treatment machine;

(f) advancing the second circulating needle bar longitudinally downstream away from the cutting station to the holding station and arresting the second needle bar in the holding station;

(g) at the cutting station affixing to the web a another one of the transversely extending circulating needle bars and, closely but spacedly downstream therefrom, the noncirculating needle bar; and

(h) repeating steps (d) and (e) with the second needle bar and the other needle bar to cut another piece from the web.

4,881,480

MARINE SAIL WITH BATTENS

William H. Stevenson, IV, P.O. Box U, St. Michaels, Md. 21663

Continuation-in-part of Ser. No. 105,742, Oct. 8, 1987, Pat. No. 4,838,192. This application Feb. 29, 1988, Ser. No. 162,198

Int. Cl.[4] B63H *9/04*

U.S. Cl. 114—103 **14 Claims**

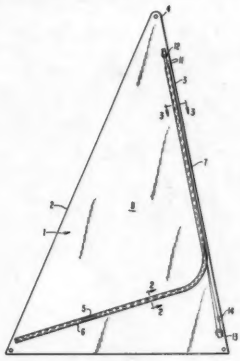
1. A marine sail comprising, in combination:

a sail body having a leech and a forward edge spaced forwardly of the leech;

an elongated batten;

means for holding the batten in an operative position relative to the sail body when the sail is at least partially unfurled; and

means for slidably moving the batten generally along its axis relative to the sail body to a position in which the batten is at least generally parallel to the forward edge of the sail body when the sail is being furled,



the batten having adequate stiffness in its operative position to stiffen the sail body along the batten.

4,881,481

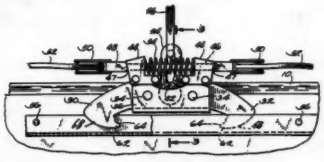
TRAVELER CONTROL

Hans P. Asmussen, 2620 S. Shore Dr., Milwaukee, Wis. 53207

Filed Oct. 31, 1988, Ser. No. 265,045

Int. Cl.[4] B63B *21/24*

U.S. Cl. 114—204 **9 Claims**



1. A traveler control for the mainsheet on a sailboat, comprising,

an elongated athwartship track having a center midway between the ends of the track,

a car mounted on said track for movement athwartship and having a connector to which a mainsheet is connected,

a pair of opposed hooks each of which is mounted on said car for movement between an operative position and an inoperative position, and

a fixed stop pin mounted on said track on each side of the center of said track,

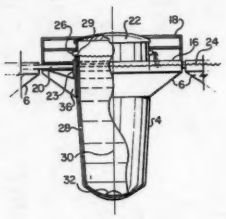
each hook including a hooking surface operative to engage a stop pin as the car moves from either end of said track towards the center of the track with said hook in its operative position.

4,881,482

FLOATING STORAGE FACILITY FOR FLUID-LIKE MATERIALS

Stanley R. Sandwith, 4883 Coleman Place, Delta, B. C., Canada, and Daniel Wittenberg, 3459 River Road West, Ladner, B. C., Canada

Filed May 31, 1988, Ser. No. 200,448
Claims priority, application Canada, Oct. 30, 1987, 550714
Int. Cl.[4] B63B *35/44*
U.S. Cl. 114—256 **11 Claims**



1. A self-contained mobile water floating storage facility module for fluid-like materials comprising:

(a) waterproof pressure compensating hollow flexible diaphragm means which is suitable for retaining therein a fluid-like product within the interior of the diaphragm means, said diaphragm means being enclosed except for an opening at the top which is maintained above the surface of the water;

(b) flotation means associated with the diaphragm means, said flotation means being adapted to enable the majority of the diaphragm means to be immersed in the water while maintaining the opening of the diaphragm means above the surface of the water; and

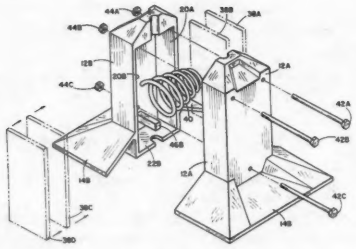
(c) containment means connected with the flotation means and the diaphragm means, said containment means enclosing a substantial portion of the diaphragm means below the surface of the water, and being open at the top to receive therein the top open end of the diaphragm means.

4,881,483

BOAT ANCHOR

J. B. Wood, 1503 E. Edgewood La., Sapulpa, Okla. 74066

Filed Jan. 30, 1989, Ser. No. 303,313
Int. Cl.[4] B63B *21/24*
U.S. Cl. 114—294 **8 Claims**



1. A boat anchor comprising:

an enclosed housing having a cavity therein defined in part by two opposing internal walls, the housing having opposed ends;

means at one end of said housing for attachment of a flexible cable means whereby the anchor may be attached to a boat;

outwardly extending flange means at the other end of the housing;

a plurality of generally flat weight members received in said housing; and

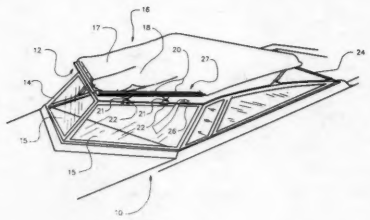
a spring means between said weight members urging them against said housing opposed internal walls.

4,881,484

AIR DEFLECTOR FOR SECURING BOAT TOP

John F. Cavanaugh, 210 E. Glassboro Ct., Box 10, Hernando, Fla. 32642

Continuation of Ser. No. 50,690, May 18, 1987, abandoned. This application Jul. 29, 1988, Ser. No. 227,437
Int. Cl.[4] B63B *17/02*
U.S. Cl. 114—361 **15 Claims**



1. An apparatus for securing and supporting a forward edge of an existing canvas top to an existing windshield with the windshield having a top edge and for directing a flow of air, comprising:

an air deflector extending in use substantially parallel to and coextensively with the top edge of the windshield for directing in use a flow of air;

said air deflector having a top surface and a lower surface;

a mounting means for permanently securing said lower surface of said air deflector in use to the top edge of the windshield and to permanently space said air deflector apart from the top edge of the windshield thereby forming an opening between the windshield and said air deflector to provide for air flow through said opening; and

a fastening means disposed on said air deflector for removably securing the forward edge of the canvas top to said top surface of said air deflector to enable in use the flow of air through said opening when said air deflector is secured to the top edge of the windshield and the canvas top is secured to said air deflector and to provide support of the forward edge of the canvas top.

4,881,485

ORNAMENTAL VEHICLE IDENTIFICATION DEVICE

Vera L. Feinberg, 1902 S. Ocean Blvd., Apt. 502, Boca Raton, Fla. 33432

Filed Jun. 10, 1988, Ser. No. 204,741
Int. Cl.[4] B60Q *1/26*
U.S. Cl. 116—28 R **1 Claim**

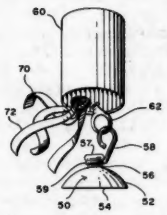
1. A ornamental identification device for vehicles, wherein the device is adapted to be secured to a surface of the vehicle, which comprises, in combination:

a removable mount for attachment to the surface of said vehicle;

a frangible, semi-rigid, disposable container for comestibles from which any comestible has been substantially removed through an opening therein; and having an eye; formed by a ring attached to said container

a plurality of streamers inserted into said opening; and

means for attachment of said mount said container comprising a hook having a tail attached to said mount, said hook



being adapted to engage said eye of the comestible container.

4,881,486

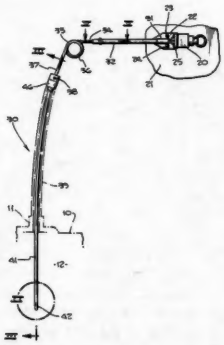
REMOTE INDICATING DIP STICK

William M. Willis, 19440 Citronia St., Northridge, Calif. 91324

Filed Oct. 4, 1988, Ser. No. 253,226

Int. Cl.[4] G01F *23/04, 23/06*

U.S. Cl. 116—227 **9 Claims**



1. A manually operated fluid level indicator for indicating at a location remote from a fluid reservoir whether the level of fluid therein has reached a predetermined level, said indicator comprising:

an indicator housing and means for mounting it at a location remote from said reservoir, said housing having a chamber therein;

a fluid conduit connected at one end to said housing in fluid communication with said housing chamber and having a second end depending into said reservoir and having an aperture in said second end, said aperture being normally closed by fluid in said reservoir when said fluid is above a predetermined level, but being opened to the interior of said reservoir when the level of fluid in said reservoir falls to a level below said predetermined level;

a plunger manually moveable inwardly and outwardly of said housing in a pumping action relative said chamber and associated conduit;

a piston in said chamber and means for biasing said piston to move relative said housing with movement of said plunger when the level of fluid in said reservoir is below said conduit second end aperture and to remain stationary relative said housing with movement of said plunger when the level of fluid in said reservoir is above said conduit second end aperture; and wherein

said housing is provided with a chamber venting aperture for venting said chamber to atmosphere when said plunger is fully withdrawn relative said housing whereby air is pumped through said conduit from said chamber by movement of said plunger inwardly of said chamber following a fully withdrawn movement thereof to purge said conduit of reservoir fluid.

4,881,487

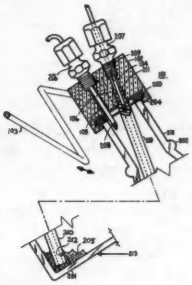
FLUID LEVEL SENSING METHOD AND APPARATUS

Scott E. Moore, Boise, Id., assignor to Micron Technology Inc., Boise, Id.

Filed Nov. 21, 1988, Ser. No. 273,580

Int. Cl.[4] B65B *3/04;* **G01N** *21/27, 1/10*

U.S. Cl. 116—227 **10 Claims**



1. Apparatus to sense a predetermined level of a fluid being dispensed from a bottle means by a pump, comprising:

(a) a substantially vertical pickup tube within said bottle means, having a bubble hole located at a preselected point along its length at a corresponding elevation to the predetermined level to be sensed, said pickup tube having a first end immersed in the fluid, so that as said fluid is being pumped out of said bottle means through said pickup tube, said fluid level moves along the outside of said pickup tube and passes said bubble hole, said bubble hole then introducing a bubble into said pickup tube; and

(b) bubble detection means mounted within said bottle means and at a second end of said pickup tube, to detect said bubble and hence said predetermined level.

4,881,488

EQUIPMENT FOR AUTOMATING THE DISTRIBUTION OF PREPARATORY SOLUTION USED IN THE RECAPPING OF TIRE TREADS

Tosco Fantacci, Pistoia, Italy, assignor to CISAP S.p.A., Pistoia, Italy

Filed May 26, 1988, Ser. No. 199,325

Claims priority, application Italy, May 27, 1987, 9397 A/87

Int. Cl.[4] B05B *13/04;* **B05C** *5/00*

U.S. Cl. 118—320 **9 Claims**

7. An arrangement for automatic distribution of a solution over surfaces of a tire, comprising:

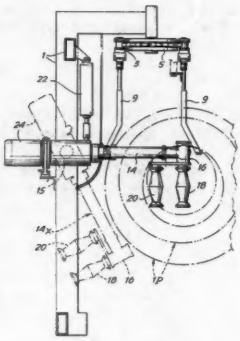
a conveyor including suspension means for suspending a plurality of tires, each tire of the plurality of tires being positioned at spaced-apart locations along said conveyor, said conveyor being movable to position tires along a tire path and successively position tires adjacent a treatment location;

tire bead engagement means movable between a position outside of the tire path and a position along the tire path, for engaging beads of a tire, of the plurality of tires, positioned at the treatment location and for rotating the tire

positioned at the treatment location about a predetermined tire axis of rotation;

a spray nozzle positioned adjacent said treatment location; and

spray nozzle movement means, connected to said spray



nozzle, for moving said spray nozzle about a spray nozzle axis between a first and second position, to spray the surface of the tire positioned at the treatment location upon rotation of the tire positioned at the treatment location, said spray nozzle axis being substantially perpendicular to the tire axis of rotation.

4,881,489

COLOR CODING LIGHT WAVE CONDUCTORS

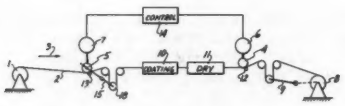
Wolfram Klebl, Isernhagen; Rainer Bruenn, Essel, and Harry Staschewski, Langenhagen, all of Fed. Rep. of Germany, assignors to Kabelmetal Electro GmbH, Hanover, Fed. Rep. of Germany

Filed Jun. 14, 1988, Ser. No. 207,117

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1987, 3720044

Int. Cl.[4] B05C *9/14, 11/00*

U.S. Cl. 118—672 **7 Claims**



1. In an apparatus for color coding and dyeing or otherwise marking a light wave conductor optical fiber passing through dyeing equipment and a drying stage and being unreeled from a spool for such passage, the marked conductor being taken up by another spool or the like, the improvement comprising:

first and second drives respectively arranged upstream and downstream from the dyeing equipment in engagement with the conductor for pulling the same from the supply spool and through the dyeing equipment; and

control means for ensuring uniformity in the driving and a particular linear drive speed of the conductor as being driven by the first and second drives, and as passed by them through the dyeing equipment.

4,881,490

ABSORBENT COMPOSITION, AND METHOD OF MAKING SAME

Cyril L. Ducharme, 3405 High Ln., Long Lake, Minn. 55356; Ralph C. Eich of, Union Lake, Erskine, Minn.; David A. Heider, 776 Fairmount Ave., St. Paul, Minn. 55105; Denny W. Neiberger, 5238 Holiday Rd., Minnetonka, Minn. 55345, and Fred Maass, 856 Carpenter St., Oak Park, Ill. 60134

Filed Feb. 19, 1988, Ser. No. 157,913

The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.

Int. Cl.[4] A01K *1/015*

U.S. Cl. 119—1 **25 Claims**

1. In an absorbent composition comprised of clay as an absorbent material the improvement wherein said absorbent contains a nitrogenous compound absorber, said nitrogenous compound absorber being selected from the group consisting of cyclodextrin, cyclodextrin derivatives, polymerized cyclodextrin and polyacrylate compounds having a matrix system similar to cyclodextrin.

4,881,491

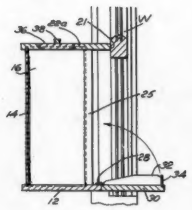
WINDOW BIRD FEEDER

Arthur C. Brown, P.O. Box 277, West Kingston, R.I. 02892

Filed Sep. 29, 1988, Ser. No. 250,608

Int. Cl.[4] A01K *31/00*

U.S. Cl. 119—51.01 **2 Claims**



1. In combination with a window and frame therefor a window bird feeder for mounting inside a dwelling comprising a substantially rectangular body having a closed rear with an open front facing the window, end walls and a back wall at least one of which is translucent, top and bottom walls, the bottom wall resting in part on the inside sill of a window frame, the top wall providing an access port opening into the interior of the rectangular body, said top wall having a front edge that lies on a line extending between the inside track of the window frame so that the edge may normally lie against the bottom sash of the window, a mounting member adjacent the end walls extending between the top and bottom walls to allow the box to be fastened to the window frame, a perch hinged to the front edge of the bottom wall to normally lie in the same plane as the bottom wall, said perch extending outwardly over the sill when the box is mounted in a window frame and adapted to fold inside and over the bottom wall in an arc in excess of 90° whereby the window may be closed when the perch is folded inside and over the bottom wall.

4,881,492

BREAK-AWAY COLLAR COUPLING DEVICE

Jeff R. Jones, 14575 Kennebunk St., Poway, Calif. 92064

Filed Aug. 18, 1986, Ser. No. 897,593

Int. Cl.[4] A01K *27/00*

U.S. Cl. 119—106 **14 Claims**

1. A collar coupling means comprising:

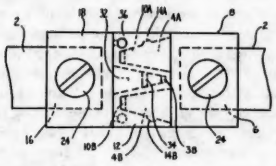
(a) a plug means,

(b) means angularly affixing the plug means to a first end of a collar,

(c) a socket means defined by a socket housing and generally conforming to the plug means,

(d) means angularly affixing the socket housing to a second end of the collar, the plug means affixing means, the socket housing affixing means together generally forming an arc when the plug means is disposed in the socket means;

(e) said means for angular affixing the plug means and the means angularly affixing the socket means each comprising, (a) an angular base member, (b) a cavity defined by the base member adapted to have disposed therein an end



portion of the collar, (c) a through-hole defined by a wall of the cavity, an axis of the through-hole intersecting the collar end portion disposed in the cavity, and (d) a screw means adapted to engage the through-hole and to vise the collar end portion between the screw means and a wall of the cavity opposite the through-hole,

(f) latching means for releasably latching the plug means in said socket means, the latching means being suitably resiliently flexible to allow the latching means to be defeated by a force of a predetermined magnitude applied to the collar in a direction which urges separation of the socket means from the first plug means.

4,881,493

STEAM GENERATOR

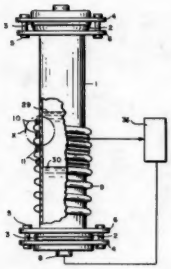
Günther Riba, Rosenbergstr. 26, D-5455 Hardert, Fed. Rep. of Germany

PCT No. PCT/EP87/00138, § 371 Date Oct. 27, 1987, § 102(e) Date Oct. 27, 1987, PCT Pub. No. WO87/05681, PCT Pub. Date Sep. 24, 1987

PCT Filed Mar. 10, 1987, Ser. No. 127,899

Int. Cl.[4] F22B *5/00*

U.S. Cl. 122—13 A **14 Claims**



1. A steam generator comprising a vertically-disposed, cylindrical boiler, means connected to the lower end of said boiler to supply water thereto, means connected to the top of said boiler for discharging steam therefrom, control means for supplying water to said means connected to the lower end of said boiler, said control means embodying an inlet and an outlet, means for generating a signal of the water level within said boiler operable to actuate said control means and heating means in the form of a coil of generally triangular cross section disposed about the outer side of the lower portion of said boiler with the broad face of its triangular cross section in all over heat-conductive contact with the outer side of said boiler.

4,881,494

ENGINE COOLING APPARATUS FOR AUTOMOTIVE VEHICLE

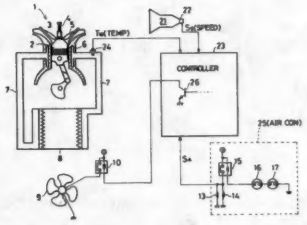
Kazuhiro Ishigami, Sagamihara, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Mar. 14, 1988, Ser. No. 167,900

Claims priority, application Japan, Mar. 16, 1987, 62-62091

Int. Cl.[4] F01P *7/02*

U.S. Cl. 123—41.12 **10 Claims**



1. An engine cooling apparatus provided with a cooling fan for an automotive vehicle, comprising:

(a) means for detecting engine temperature;

(b) means for detecting vehicle speed; and

(c) means, coupled to said engine temperature detecting means, for actuating the cooling fan when the engine temperature detecting means detects an engine temperature higher than one of plural predetermined temperature values corresponding to vehicle speed detected by the vehicle speed detecting means.

4,881,495

DEVICE FOR VAPORIZING A CRYOGENIC FLUID

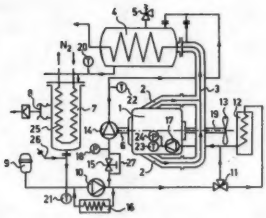
Jean Tornare, Arisdorf/BF, and Klaus Bofinger, Ettingen, both of Switzerland, assignors to Cryomec AG, Switzerland

Filed Dec. 16, 1987, Ser. No. 133,305

Claims priority, application European Pat. Off., Sep. 22, 1987, 87810547

Int. Cl.[4] F01P *1/06*

U.S. Cl. 123—41.31 **9 Claims**



1. A device for vaporizing a cryogenic fluid with an internal combustion engine (1), the exhaust heat of which can be at least partially transferred to a vaporizing unit (7), from the cooling water and the exhaust gases and through a water circuit, characterized in that a water brake (14) in the form of a water brake restrainer is present, which can be driven by the output shaft (6) of the internal combustion engine (1), and that this water

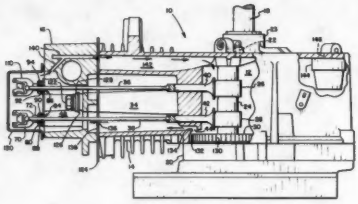
brake (14), together with at least the vaporizing unit (7), forms a closed cooling circuit for the water transferring the heat produced in the water brake.

4,881,496

VALVE MECHANISM LUBRICATION SYSTEM FOR HORIZONTAL CYLINDER OVERHEAD VALVE ENGINE

Peter G. Kronich, Sheboygan, Wis., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed May 20, 1988, Ser. No. 196,979
Int. Cl.[4] F01M *9/10, 13/02, 11/02*
U.S. Cl. 123—90.33 **20 Claims**



1. A lubrication system for the valve actuating mechanism of an overhead valve, horizontal cylinder internal combustion engine comprising:

a crankcase having lubricating oil therein;

a rocker box housing said valve actuating mechanism, said valve actuating mechanism including a lower rocker arm and an upper rocker arm with the lower rocker arm disposed for rocking in a substantially horizontal rocking plane;

a push rod cavity communicating at one end with said crankcase and at another end with said rocker box; and

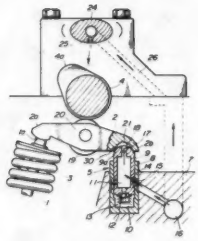
oil slinger means for slinging liquid oil from said crankcase through said push rod cavity into said rocker box such that the lower rocker arm is at least partially submerged.

4,881,497

VALVE OPERATING SYSTEM FOR INTERNAL COMBUSTION ENGINE

Yutaka Matayoshi, Yokosuka, and Shigeru Kamegaya, Tokyo, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed May 24, 1988, Ser. No. 197,886
Claims priority, application Japan, May 25, 1987, 62-125758
Int. Cl.[4] F01M *9/10*
U.S. Cl. 123—90.34 **13 Claims**



1. A valve operating system for an internal combustion engine, comprising:

a swing arm having a first end section connected to an engine valve, and a second end section, said swing arm being swingable around said second end section upon rotation of a camshaft;

a support member secured to the body of the engine and having an end section which fittingly contacts with said swing arm second end section;

means defining a clearance between said swing arm second end section and said support member end section, said clearance being filled with lubricating oil;

means defining an oil supply passage in said support member and communicating with said clearance, lubricating oil flowing through said oil supply passage and being supplied to said clearance;

means for establishing sealing contact between said swing arm second end section and said support member end section to maintain a fluid tight seal for said clearance; and

means defining a communication passage for communicating said clearance with outside of said clearance so that lubricating oil within said clearance is discharged out of said clearance only through said communicating passage, said communicating passage being defined between said swing arm second end section and said support member end section, thereby interrupting said fluid tight seal,

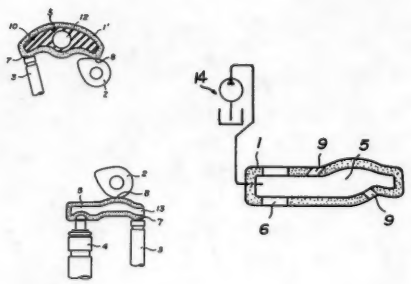
wherein said clearance (i) has a central axis that is perpendicular to an uppermost surface of said clearance and (ii) decreases in volume radially from said central axis to said fluid tight seal.

4,881,498

ROCKER ARM MADE OF CERAMICS

Tooru Matsuura, and Yoshinori Narita, both of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Mar. 2, 1989, Ser. No. 317,999
Claims priority, application Japan, Mar. 5, 1988, 63-28700[U]
Int. Cl.[4] F01L *1/18*
U.S. Cl. 123—90.39 **8 Claims**



1. A rocker arm made of ceramics and formed into a single piece, comprising:

a cavity;

a sliding surface portion; and

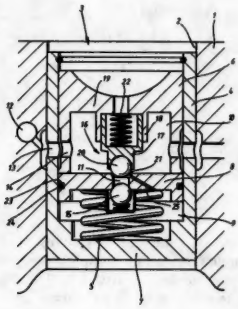
an opening providing communication between said cavity and the outside of said rocker arm.

4,881,499

HYDRAULIC PLAY COMPENSATING ELEMENT

Markus Dietrich, Fellbach-Oeffigen, and Frank Berger, Leutenbach, both of Fed. Rep. of Germany, assignors to Mercedes-Benz AG, Stuttgart, Fed. Rep. of Germany

Filed Jan. 13, 1989, Ser. No. 296,599
Claims priority, application Fed. Rep. of Germany, Jan. 15, 1988, 3800945
Int. Cl.[4] F01L *1/24, 13/06*
U.S. Cl. 123—90.52 8 Claims



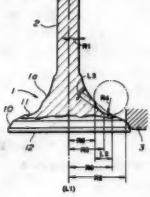
1. Hydraulic play compensating element for a valve train of an internal combustion engine comprising:
(a) a cylinder part closed at one end;
(b) a hollow piston part slidable axially in the cylinder part and having a supply chamber adapted to be pressurized by lubricating oil pressure of the internal combustion engine;
(c) a presusre chamber, enclosed by the hollow piston part and the cylinder part, for providing play compensation for the valve train of the internal combustion engine;
(d) a compression spring for biasing the cylinder part and the piston part in opposite directions;
(e) a connecting duct for connecting the pressure chamber and the supply chamber;
(f) a spring biased closure element for opening and closing the connecting duct; and
(g) a shut-off valve for opening and closing the connecting duct independently of the closure element.

4,881,500

POPPET VALVE MADE OF CERAMICS

Takio Kojima, and Masato Taniguchi, both of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Nov. 22, 1988, Ser. No. 274,908
Claims priority, application Japan, Dec. 4, 1987, 62-307951
Int. Cl.[4] F01L *3/00*
U.S. Cl. 123—188 AA 5 Claims



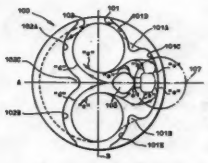
1. A poppet valve made of ceramics, comprising:
a valve head having a valve seat contacting portion; and
a valve stem integral with said valve head;
said valve head having an inclined surface extending between said valve head and said valve seat contacting portion;
said inclined surface having an annular portion in the place intermediate between said valve stem and said valve contacting portion;
said inclinded surface being ground at said annular portion only.

4,881,501

DIESEL ENGINE HAVING SHAPED FLAME DISPERSING RECESS IN PISTON CROWN

Motohiro Shinzawa, Yokosuka, and Yoshiki Sekiya, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jan. 31, 1989, Ser. No. 304,076
Claims priority, application Japan, Feb. 3, 1988, 63-23388
Int. Cl.[4] F02F *3/26*
U.S. Cl. 123—279 12 Claims



1. In an internal combustion engine
a piston reciprocatively disposed in a bore to define a variable volume combustion chamber; and
a swirl chamber, said swirl chamber being fluidly communicated with the combustion chamber by a transfer passage, said piston comprising:
an essentially flat crown;
a shaped cavity formed in said crown, said cavity defining first and second shaped opposed wall portions;
a first flame deflecting projection, said first flame deflecting projection comprising a member which is disposed in said cavity, said first flame deflecting projection being arranged to be in the path of the flame which ejects from said transfer passage during the expansion phase of the engine and when the piston is close to its TDC position;
said first shaped wall being arranged to have first and second guide portions, said first and second guide portions extending essentially toward said first flame deflecting projection, said first wall further comprising a first curved section which merges with said first and second guide portions, said first curved section extending along the crown of said piston in a location which is proximate the mouth of said transfer port when the piston is close to TDC, said first and second guide portions and said first curved portion defining in part a first flame dispersing zone in said cavity, said first curved wall portion being so constructed and arranged as to deflect a portion of the flame which flows theretoward and which promotes mixing of the flame with the air contained in said first flame dispersing zone.

4,881,502

PEDAL FORCE RESPONSIVE ENGINE CONTROLLER

Daniel F. Kabasin, Rochester, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 24, 1988, Ser. No. 235,674
Int. Cl.[4] F02D *11/10, 41/22*
U.S. Cl. 123—399 3 Claims

1. A control system for an internal combustion engine of a

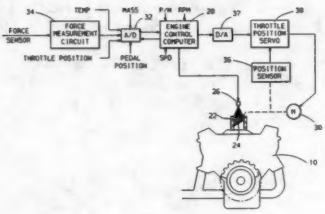
vehicle, the engine having an intake space into which air and fuel are supplied, the system comprising in combination:

an accelerator pedal biased to an engine idle position and operable to an engine off-idle position in response to a force applied thereto;

position sensing means for sensing the position of the accelerator pedal established by force applied thereto;

force sensing means for sensing the force applied to the accelerator pedal;

normal fuel control means selectively operable (A) in a first mode for controlling the air and fuel mixture in accord with the accelerator pedal position sensed by the position



sensing means and (B) in a second mode for controlling the air and fuel mixture in response to a predetermined operating condition independent of the accelerator pedal position, the force applied to the accelerator pedal being normally zero in the second mode;

means for sensing selected operation of the normal fuel control in the second mode; and

means for controlling the air and fuel mixture to a predetermined amount independent of the normal fuel control means in the absence of a sensed selected operation of the normal fuel control in the second mode when the force applied to the accelerator pedal is zero.

4,881,503

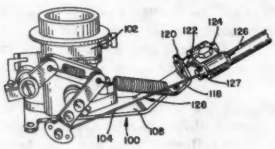
THROTTLE CABLE CONTROL ASSEMBLY FOR CARBURETORS

Norman H. Andreasen, 1522 Norwood Ave., Itasca, Ill. 60143

Filed May 11, 1989, Ser. No. 350,241

Int. Cl.[4] F02D *11/04*

U.S. Cl. 123—400 **11 Claims**



1. A throttle cable control assembly for carburetors comprising a bracket body for attachment to the carburetor, said bracket body having a base for mounting on the carburetor and at least one arm extending outward from said base, said at least one arm includes a free end portion, a post mounted on said free end portion of said base, and clamp means being adjustably clamped to said post and to the throttle cable for the carburetor.

4,881,504

FUEL INJECTION PUMP

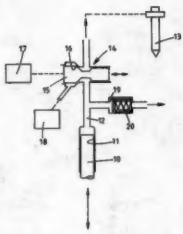
Christopher H. Best, Maidstone, England, assignor to Lucas Industries Public Limited Company, Birmingham, England

Filed Feb. 1, 1988, Ser. No. 150,893

Claims priority, application United Kingdom, Feb. 13, 1987, 8703419

Int. Cl.[4] F02M *39/00*

U.S. Cl. 123—447 **1 Claim**



1. A fuel injection pump for supplying fuel to an internal combustion engine comprising a plunger reciprocable within a bore, means including a cam driven by the associated engine for causing reciprocation of the plunger, an outlet from the bore, said outlet being connected to a fuel injection nozzle of said engine, a spill valve connected to said outlet, said spill valve including a spill valve member movable into contact with a seating to prevent flow through said valve, an electromagnetic device coupled to said spill valve member, said device when energized causing movement of said valve member into contact with said seating and a resiliently loaded piston located upstream of said spill valve and housed within a cylinder, said piston and cylinder in communication with said outlet whereby upon closure of said spill valve during a pumping stroke of said plunger, fuel will be displaced from said bore to said cylinder, said piston moving in response to fuel displaced by said spill valve and said plunger so as to maintain the fuel pressure in said bore at a level below the pressure of fuel required to open a valve in said injection nozzle, until a predetermined movement of said piston has taken place.

4,881,505

ELECTRONIC LEARNING CONTROL APPARATUS FOR INTERNAL COMBUSTION ENGINE

Naoki Tomisawa, Isesaki, Japan, assignor to Japan Electronic Control Systems Co., Ltd., Isesaki, Japan

Filed Oct. 19, 1988, Ser. No. 260,003

Claims priority, application Japan, Oct. 20, 1987, 62-262782; Oct. 20, 1987, 62-262783; Oct. 20, 1987, 62-262784; Oct. 20, 1987, 62-262791; Oct. 20, 1987, 62-262793

Int. Cl.[4] F02M *51/00*

U.S. Cl. 123—480 **20 Claims**

1. An electronic learning control apparatus for an internal combustion engine, which comprises:

engine driving state detecting means for detecting the driving state of the internal combustion engine;

basic control quantity setting means for setting a basic control quantity corresponding to a target control value of an objective control factor;

feedback correction value setting means for comparing the actual control value with the target control value and setting a feedback correction value for bringing the actual control value close to the target control value by increasing or decreasing the actual control value;

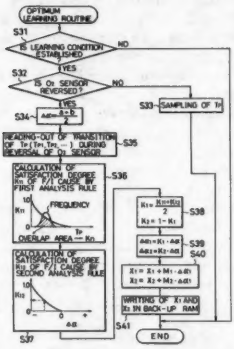
rewritable learning correction value storing means for storing a learning correction value for each of a plurality of error causes, control quantity computing means for computing a control quantity by making a correction based on the learning correction value for each of the error causes

according to a computing formula set for each of the error causes;

control means for controlling the objective control factor of the internal combustion engine according to the computed control quantity;

entire deviation detecting means for detecting the entire deviation of the feedback correction value from a predetermined reference value;

error cause analyzing means for analyzing qualitatively and quantitatively a cause for producing an error in said entire



deviation according to a predetermined analysis rule and separating the entire deviation into deviations of the respective error causes based on the analysis results;

learning correction value setting means for computing and setting the learning correction value of each error cause based on the deviation of each error cause; and

learning value renewal means for rewriting the learning correction value of each error cause stored in said storing means based on the set learning correction value of each error cause.

4,881,506

INJECTION PUMP WITH PREINJECTION

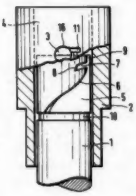
Manfred Hoecker, Rosrath, Fed. Rep. of Germany, assignor to Kloeckner-Humboldt-Deutz AG, Fed. Rep. of Germany

Filed Jun. 9, 1988, Ser. No. 204,594

Claims priority, application Fed. Rep. of Germany, Jun. 10, 1987, 3719253; Feb. 10, 1988, 3804018

Int. Cl.[4] F02F *39/00, 39/28*

U.S. Cl. 123—503 **22 Claims**



1. An injection pump for a diesel engine including a casing having a cylinder with a pump chamber (4) in which a rotatable and reciprocatable pump plunger (1) operates and to which fuel is supplied through a main release opening (3) during the intake stroke of the plunger (1) and from which fuel is release through said main release opening (3) near the end of the delivery stroke of plunger (1) via a first release groove (5) with a slanting control edge (6) in the outer cylindrical surface of the pump plunger, and with a second release groove (7) in said outer cylindrical surface between said first release groove (5) and the pump plunger upper edge (13) which in a specific rotational and axial position of pump plunger (1) registers with an auxiliary release opening in pump cylinder (2), whereby the upper edge (14) of said second release groove (7) inclines relative to said pump plunger upper edge (13) at an angle whose size is between one-half the size of the angle of inclination of upper edge (6) of said first release groove (5) relative to said plunger upper edge (13) and an angle which is 6 degrees greater than one-half said angle of inclination.

4,881,507

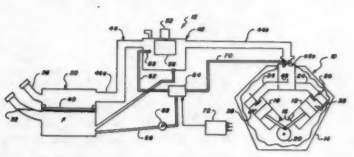
FUEL SUPPLY MECHANISM FOR AN INTERNAL COMBUSTION ENGINE

Frank J. San Filipo, P.O. Box 536, Lakeville, N.Y. 14480

Filed Jan. 4, 1988, Ser. No. 140,400

Int. Cl.[4] F02M *17/26*

U.S. Cl. 123—523 **9 Claims**



1. A fuel supply mechanism for an internal combustion engine having a plurality of combustion chambers, said mechanism comprising:

a remote reservoir adapted to contain a primary supply of fuel;

means, located in said remote reservoir, for evaporating fuel in said remote reservoir into an air stream moving therethrough; and

means for transporting said air stream containing such evaporated fuel from said remote reservoir directly into said combustion chambers of said internal combustion engine, said evaporated fuel transporting means including a conduit connected at one end to said remote reservoir and at the opposite end to an intake chamber for said combustion chambers of said engine, a housing located in said conduit intermediate said remote reservoir and said intake for said combustion chambers, and fan apparatus associated with said housing for moving evaporated fuel through said conduit to said combustion chambers.

4,881,508

HEATING DEVICE FOR FLUID, PARTICULARLY FUEL

Fredrik M. N. Van Den Elst, Almelo, and Jan Bakker, Hengelo, both of Netherlands, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 19, 1988, Ser. No. 157,817

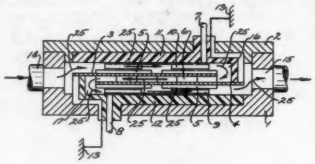
Claims priority, application Netherlands, Feb. 20, 1987, 8700430

Int. Cl.[4] F02M *31/12*

U.S. Cl. 123—549 **4 Claims**

1. A fluid heater comprising a thermally conductive metal plate, a self-regulating electrical resistance heater element of a ceramic material of positive temperature coefficient of resistivity mounted on the plate in heat-transfer relation thereto, fin-means of thermally conductive material secured in heat-transfer relation to the plate and extending from the plate for transferring heat from the plate to a fluid, means for electrically energizing the heater element to heat the plate, means defining a fluid flow path of selected cross-sectional configuration, the heater plate being disposed in said flow path, and the fin-means comprising a multiplicity of baffles disposed in the

flow path for introducing a multiplicity of diversions of fluid flow along each line of flow through the paths for substantially preventing laminar fluid flow therethrough, the means defining the fluid flow path defining a path having a selected width, length and height, the plate being disposed with a width and length of the plate extending in a plane along the length of the flow path, and the fin-means comprising a strip metal member having a base portion secured to the plate and having a multiplicity of baffle portions upstanding from the base to provide said multiplicity of diversions along the length of said path, characterized in that means define a second fluid flow path separate from the first-named fluid flow path, an additional thermally-conducting metal plate is disposed between the fluid flow paths, fin-means comprising an additional strip metal



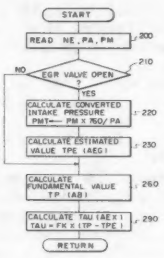
member has a base secured to one side of the additional plate and has a multiplicity of baffle portions upstanding from the base into the first-named fluid flow path in heat-transfer relation with a fluid flowing in said first-named fluid flow path, and fin-means comprising another additional strip metal member has a base secured to an opposite side of the additional plate and has a multiplicity of baffle portions upstanding from the base into the second fluid flow path in heat-transfer relation to a fluid flowing through the second fluid flow path, the baffle portions of said additional strip metal members being disposed to provide a multiplicity of diversions of fluid flow along each of the paths for rapidly transferring heat from a fluid flowing in one of the fluid flow paths to a fluid flowing in the other fluid flow paths.

4,881,509

ELECTRONIC CONTROL DEVICE FOR INTERNAL COMBUSTION ENGINE WITH EGR CONTROL APPARATUS

Michihiro Ohashi, Mishima, and Norio Nakamura, Susono, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Aug. 19, 1988, Ser. No. 234,373
Claims priority, application Japan, Aug. 21, 1987, 62-208913
Int. Cl.[4] F02M *25/06*
U.S. Cl. 123—571 **7 Claims**



1. An electronic control device for controlling an internal combustion engine by means of a control value, said engine having an intake pipe, an exhaust pipe, an exhaust gas recirculating passage extending between said exhaust pipe and said intake pipe, and a vacuum-operated control valve arranged in said exhaust gas recirculating passage, said electronic control device comprising:

first detecting means for detecting a revolutional speed of said engine;

second detecting means for detecting an intake pressure in said intake pipe;

third detecting means for detecting an atmospheric pressure;

first calculating means for calculating a fundamental value of said control value in response to said intake pressure and said revolutional speed;

second calculating means for converting said detected intake pressure under said detected atmospheric pressure into a converted intake pressure under a predetermined atmospheric pressure in response to said atmospheric pressure;

third calculating means for calculating a correcting value of said control value in response to said revolutional speed and said converted intake pressure, said correcting value being in correspondence with an amount of recirculated exhaust gas attained under said predetermined atmospheric pressure when said vacuum-operated control valve is opened; and

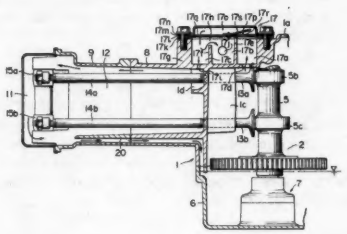
control means for controlling engine operation in response to said fundamental value when said vacuum-operated control valve is closed, and in response to said fundamental value and said correcting value when said vacuum-operated control valve is opened.

4,881,510

BREATHER DEVICE OF AN ENGINE

Motoaki Etoh, and Keisuke Ishii, both of Tokyo, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 28, 1988, Ser. No. 276,577
Claims priority, application Japan, Dec. 21, 1987, 62-194659[U]
Int. Cl.[4] F01M *9/10*; F02M *25/06*
U.S. Cl. 123—572 **2 Claims**



1. A breather device of an engine having a crank chamber, a lubrication system including an oil pan holding lubrication oil, and an air intake system, said breather device comprising:

oil return passage means having a downstream end submerged in said lubrication oil in said oil pan;

an oil sump chamber communicating at a bottom part thereof with said oil return passage means;

a pressure chamber communicating with said crank chamber and provided with a pressure-responsive valve which is openable by a positive pressure within said pressure chamber to permit flow of fluid from said pressure chamber into said oil sump chamber; and

a breather chamber which is communicative over an oil holding wall with said oil sump chamber and is communicating with said air intake system, whereby:

positive pressure in said crank chamber causes blow-bye gas therein to flow via said pressure chamber and said pressure-responsive valve into said oil sump chamber, then to detour over said holding wall into said breather chamber, and to flow into said air intake system, while lubricating

oil initially contained in the blow-bye gas in the crank chamber is separated from the blow-bye gas successively in the pressure chamber, the pressure-responsive valve, and the oil sump chamber; and oil retained in the oil sump chamber is circulated back through the oil return means to the oil pan.

4,881,511

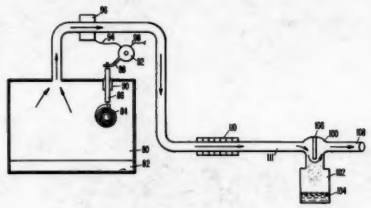
CRANKCASE VENTILATOR

John J. Pickering, 102 Barrett Ave., North Providence, R.I. 02904

Division of Ser. No. 62,072, Jun. 12, 1987, Pat. No. 4,821,513. This application Dec. 23, 1988, Ser. No. 290,269

Int. Cl.[4] F02M *25/06*

U.S. Cl. 123—572 **5 Claims**



1. A crankcase ventilator comprising a conduit adapted to be attached to crankcase and a suction means for drawing air containing vapors from said crankcase through said conduit, a temperature sensitive element adapted to be placed in thermal contact with said crankcase, means for continuously varying the rate at which said suction means draws said air containing vapors from said crankcase according to temperature, and means connecting said varying means to said temperature sensitive element for causing said suction means to draw a greater volume of air from the crankcase when the crankcase is hot than when the crankcase is cold.

4,881,512

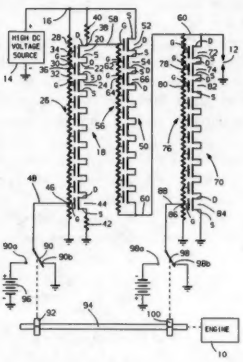
INTERNAL COMBUSTION ENGINE IGNITION SYSTEM

James C. Erskine, Birmingham, and Stephen J. Valeri, Warren, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 31, 1988, Ser. No. 238,656

Int. Cl.[4] F02P *3/01*

U.S. Cl. 123—628 **9 Claims**



1. An ignition system for a spark ignited internal combustion engine comprising, an internal combustion engine, a spark plug for igniting the combustible mixture in a cylinder of said engine, a source of direct voltage having a magnitude that is high enough to cause said spark plug to fire when applied to said spark plug to ignite said combustible mixture, a high voltage semiconductor switch connected between said source of voltage and said spark plug, said semiconductor switch comprising a plurality of series connected transistors, each of said transistors having two current carrying electrodes and a control electrode, the current carrying electrodes of said transistors being connected in series, a voltage divider having a plurality of junctions, means connecting respective control electrodes of said transistors to respective junctions of said voltage divider, and means coupled to a movable part of said engine and to said voltage divider for causing said transistors to be biased alternately conductive and nonconductive.

4,881,513

TWO-CYCLE INTERNAL COMBUSTION ENGINE

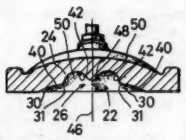
Tamotsu Hamanaka, Saitama, Japan, assignor to Tohatsu Corporation, Tokyo, Japan

Filed Jun. 23, 1988, Ser. No. 210,359

Claims priority, application Japan, Nov. 19, 1987, 62-292388

Int. Cl.[4] F02B *23/08, 33/44*

U.S. Cl. 123—664 **11 Claims**



1. A two-cycle internal combustion engine comprising:
a cylinder having a cylinder wall formed with a plurality of scavenging ports and a discharge port;
a cylinder head for covering a top of said cylinder;
a piston movably arranged in said cylinder;
said cylinder, cylinder head and piston cooperating together to define a combustion chamber,
said cylinder head being formed therein with a top chamber constituting a part of said combustion chamber;
an ignition plug of which a tip end is arranged in said top chamber and positioned on a vertical plane extending through said top chamber; and
a partition provided in a region of said top chamber apart from said ignition plug in a manner to extend substantially along said vertical plane from one end of said top chamber by a distance toward said ignition plug, to thereby divide said region into two compartments;
said partition cooperating with said top chamber to define corners on both sides of said one end of said top chamber with said partition being interposed therebetween, said corners serving to direct fuel gas supplied to said top chamber toward ignition plug;
said scavenging ports being arranged to feed fuel gas through said partition to said corners;
said discharge port being arranged on a side of said cylinder wall opposite to said corners.

4,881,514

ARCHERY BOW

Jurnior J. Denslow, and Ronald S. Denslow, both of Lakeview, Mich., assignors to Benslow Incorporated, Lakeview, Mich.

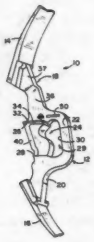
Filed Jun. 30, 1988, Ser. No. 213,313

Int. Cl.[4] F41B *5/00*

U.S. Cl. 124—23 R **9 Claims**

1. An archery bow comprising:
an elongated flexible member having a central riser and a pair of limbs extending oppositely therefrom, said riser

being shaped to define a generally channel-shaped recess opening away from an archer when using said archery bow and a handle positioned adjacent to and rearwardly of said recess and inwardly of the concave shape of said bow to effect an easy, comfortable manner of carrying the bow;



a bowstring attached to each end of said limbs and extending tautly therebetween, said bowstring being positioned rearwardly of said handle such that said handle is oriented between said recess and said bowstring; and

a hand grip rotatably mounted to said riser in said recess for improved accuracy in shooting.

4,881,515

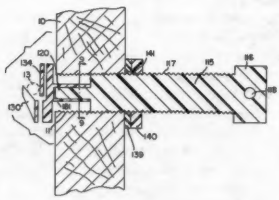
LATERALLY ADJUSTABLE REPLACEABLE ARROW REST

Miroslav A. Simo, 370 N. Delaplaine Rd., Riverside, Ill. 60546

Continuation-in-part of Ser. No. 788,486, Oct. 17, 1985, Pat. No. 4,732,135, which is a continuation-in-part of Ser. No. 482,186, Apr. 5, 1983, Pat. No. 4,548,188. This application Mar. 18, 1988, Ser. No. 170,161

Int. Cl.[4] F41C *5/00*

U.S. Cl. 124—24 R **47 Claims**



9. In a laterally adjustable replaceable arrow rest and mounting means mounted on a bow handle, an arrow rest having a pivotal arrow support means which automatically returns to an initial position after discharge of an arrow comprising: said mounting means including a mounting plate and an adjustable screw which is threadably engaged with a threaded hole in the bow handle and said arrow rest including a second connecting means secured to and extending outward from an opposite side of said mounting plate, said opposite side being in a generally opposite direction from an arrow side of said mounting plate, and said second connecting means is mateable with a first connecting means on said mounting means; a pivotal arrow support arm pivotally attached to a side of said arrow rest facing toward said arrow by a resilient arm spring means formed by an arm groove in resilient polymeric material, and said arm groove forming an arm section of said arrow support arm having an arm reduced moment of inertia, with respect to an arm moment of inertia of adjacent arm sections of said arrow support arm, thereby reducing an arm force necessary to deflect a support arm cantilever portion.

4,881,516

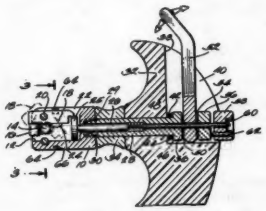
ADJUSTABLE GRIP AND TRIGGER BOW STRING RELEASE

Paul L. Peck, Fond du Lac, Wis., assignor to Archery Designs, Inc., North Fond du Lac, Wis.

Filed May 16, 1988, Ser. No. 194,221

Int. Cl.[4] F41C *19/00*

U.S. Cl. 124—35 A **6 Claims**



1. A bow string release comprising,

a body having a string receiving notch in one end of said body and an axial hole through the other end of said body,

a sear pivoted in the body adjacent said notch and having string retaining means operative to retain a bow string in said notch when said sear is in its operative position,

handle means having an axial hole therethrough,

an internal shoulder in said axial hole in said body,

guide means comprising a guide sleeve having one end threaded into said axial hole of said body and extending through said axial holes, an enlargement on the other end of said guide sleeve capturing said handle means relative to said guide sleeve, said guide sleeve bearing against said shoulder to fix the location of said enlargement relative to said body,

a Belleville spring effective between said other end of said guide sleeve and said handle means to take up dimensional variations,

pull pin means slideably mounted in said guide sleeve for movement between a first position and a retracted position, said pull pin means engaging said sear in said first position to retain said sear in said operative position and releasing said sear upon movement to said retracted position,

spring means biasing said pull pin means to said first position,

a trigger carried by said handle means and operative to move said pull pin means to said retracted position,

means adjusting the axial position of said pull pin means relative to said sear to adjust the release stroke of said pull pin means,

said guide sleeve being non-rotatable relative to said body during use of the release and during adjustment of the release,

said handle means and said body being rotatable relative to each other and relative to said pull pin means and the release stroke of said pull pin means remaining constant during rotation of said handle means and said body relative to each other and relative to said pull pin means.

4,881,517
AIR GUNS

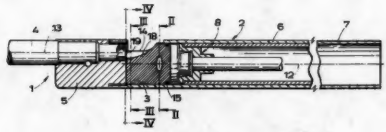
Roger D. Wackrow, Redditch, and Harold C. Jones, Studley, both of England, assignors to BSA Guns (UK) Limited, Birmingham, England

Filed Mar. 10, 1988, Ser. No. 166,385

Claims priority, application United Kingdom, Mar. 13, 1987, 8705993

Int. Cl.[4] F41B *11/00*

U.S. Cl. 124—65 **17 Claims**



1. An air gun comprising a body which houses a source of compressed gas, a barrel which is fixed in relation to said body and which has a bore extending forward from a bore entry at a rear end of said barrel, and a breech block mounted rearwardly of and adjacent to said bore entry, said block being shaped externally to form a guide chute and having a through passage separate from said chute, said breech block being angularly movable between a loading position in which said guide chute is aligned with said bore entry and said entry is exposed for a pellet to be inserted manually into position in said entry and a firing position in which said guide chute is displaced from said entry and said through passage is aligned with said entry and completes a connection for gas between said source of compressed gas and said entry, said passage not being aligned with said entry and not communicating with said entry when said breech block is in said loading position.

4,881,518
APPARATUS FOR MANUFACTURING AND HANDLING THIN WAFERS

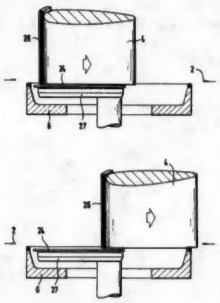
Fritz Feldmeier, Nuremberg, Fed. Rep. of Germany, assignor to GMN Georg Muller Nurnberg AG, Fed. Rep. of Germany

Filed Nov. 3, 1988, Ser. No. 266,790

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1987, 3737540

Int. Cl.[4] B28D *5/04*

U.S. Cl. 125—14 **5 Claims**



1. Apparatus for manufacturing thin wafers of hard, nonmetallic material, such as monocrystalline or polycrystalline material for use as semiconductor substrates, from a bar of such material, said wafers having at least one substantially precisely planar surface, comprising:

internal hole saw means including a blade having an inner peripheral blade edge for slicing said bar to separate a disc-shaped wafer therefrom having a first surface constituted by an end face of said bar, said inner peripheral blade edge defining an open region of said saw means;

a substantially cup-shaped grinding wheel having peripheral grinding means situated at said open region of said inner blade edge for grinding said end face of said bar to a substantially precisely planar condition prior to completion of said slicing by said saw means;

means associated with said saw means for holding said bar during said slicing, said holding means including a holder member fastened to a side surface of said bar extending longitudinally at least from said end face thereof, said holder member adapted to be partially, but not completely, sliced through by said saw means after a wafer is separated from said bar by said saw means so that a portion of said holder member connects said separated wafer to said bar;

said peripheral grinding means of said cup-shaped grinding wheel comprises means for abrading said portion of said holder member connecting said separated wafer to said bar to disconnect said wafer from said bar ;

take-off plate means situated substantially within said cup-shaped grinding wheel for receiving and holding said separated wafer after said separated wafer has been disconnected from said bar by said peripheral grinding means of said cup-shaped grinding wheel; and

transfer arm means for picking up a wafer from said take-off plate means and transferring it for subsequent processing.

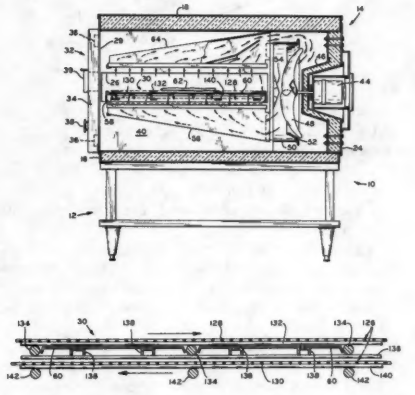
4,881,519
HOT AIR OVEN HAVING INFRA-RED RADIANT SURFACES

Mitchell C. Henke, Fort Wayne, Ind., assignor to Lincoln Foodservice Products, Inc., Fort Wayne, Ind.

Filed Jul. 18, 1988, Ser. No. 220,462

Int. Cl.[4] A21B *1/00*; A23L *3/00*

U.S. Cl. 126—21 A **16 Claims**



1. A food preparation oven, comprising:

an enclosure defining a chamber for receiving a food product therein;

support means for supporting a food product in said chamber;

air recirculating means, including an inlet, for recirculating a mass of air within said chamber;

heating means for heating the recirculating air within said chamber; and

a return duct in flow communication with the inlet of said recirculating means, said return duct including a wall

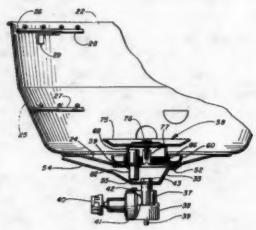
disposed above and generally parallel to said support means, the wall having an outer radiant energy emissive surface means for radiating infra-red energy towards said support means when said wall is heated, said return duct further including means for heating said wall by communicating heated air from said chamber into said return duct.

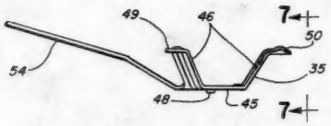
4,881,520

PROPANE-FUELED COOKING APPARATUS

Dennis V. Hefling, Wichita, Kans., assignor to The Coleman Company, Inc., Wichita, Kans.

Continuation-in-part of Ser. No. 930,520, Nov. 14, 1986, Pat. No. 4,759,339. This application Nov. 13, 1987, Ser. No. 120,038
Int. Cl.[4] F24C *3/04, 3/08*
U.S. Cl. 126—44 5 Claims





3. A gas grill which is adapted to be connected to a propane tank comprising:

(a) a bowl-shaped casing having a bottom wall and an upwardly extending side wall;

(b) a burner bowl supported inside the casing by the bottom wall thereof;

(c) a burner assembly mounted on the burner bowl;

(d) a regulator assembly including a threaded connector adapted to be connected to a propane tank whereby the propane tank is supported solely by the regulator assembly;

(e) a mounting bracket attached to the bottom wall of the casing below the burner bowl, the mounting bracket having a central portion attached to the regulator assembly and a plurality of arms which extend outwardly and upwardly from the central portion and which are attached to the bottom wall of the casing, said arms of the mounting bracket providing the only connection between the regulator assembly and the casing, each of the arms terminating in an end portion which includes a convex embossment which engages the casing in the area of the attachment between the arm and the casing for minimizing heat convection between the casing and the arm;

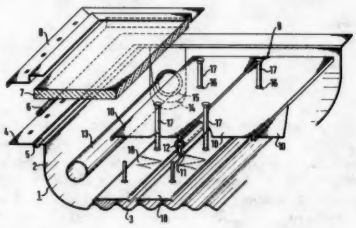
(f) a plurality of legs attached to the casing and extending downwardly therefrom for supporting the casing above a support surface so that the propane tank does not contact the support surface.

4,881,521

VACUUM SOLAR COLLECTOR

Bernd Kellner, Ruckkickerweg 5, D-8400 Regensburg 25, Fed. Rep. of Germany

PCT No. PCT/EP87/00189, § 371 Date Oct. 5, 1988, § 102(e) Date Oct. 5, 1988, PCT Pub. No. WO87/06328, PCT Pub. Date Oct. 22, 1987
PCT Filed Apr. 7, 1987, Ser. No. 272,742
Claims priority, application Fed. Rep. of Germany, Apr. 8, 1986, 3611764
Int. Cl.[4] F24V *2/10*
U.S. Cl. 126—438 20 Claims



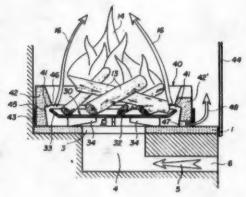
1. Vacuum solar collector comprising an integrally seamless deep-drawn sheet metal trough (1) which contains an absorber (9) and conduits (12, 13) for a heat transport medium and has an edge (4) on which a radiation-permeable pane (7) rests which covers the sheet metal trough and which is supported over a trough bottom wall by support elements (17) which lie at intervals apart and which in turn bear against metal members disposed on the trough bottom wall (3), characterized in that the trough bottom wall (3) is undulated in the form of a corrugated sheet.

4,881,522

METHOD FOR ACTIVATING THE COMBUSTION IN A HEATING APPARATUS USING SOLID FUEL, AND CHIMNEY FOR IMPLEMENTING SUCH METHOD

André Meusy, 6, ruelle du Canal, CH-2926 Boncourt, Switzerland

PCT No. PCT/CH86/00164, § 371 Date Aug. 7, 1987, § 102(e) Date Aug. 7, 1987, PCT Pub. No. WO87/03669, PCT Pub. Date Jun. 18, 1987
PCT Filed Nov. 26, 1986, Ser. No. 96,352
Claims priority, application France, Dec. 6, 1985, 8518219
Int. Cl.[4] F24B *7/00*
U.S. Cl. 126—540 7 Claims



1. A fireplace hearth fitting for activating combustion for burning solid fuel, including a metallic support in the form of a dish having a raised free edge which is continuous along the whole periphery of said dish, and support elements for maintaining said dish at a predetermined height, and an air emission opening underneath said dish defining under the dish a preheating zone for combustion air, said combustion air flowing from

said preheating zone upwardly along said raised free edge as a substantially continuous stream over the whole periphery of said dish, including a belt laterally surrounding said dish and said preheating zone, said belt being disposed in such manner as to define with the edge of the dish an air emission slit extending over the entire periphery of the dish, for the passage of air coming from said preheating zone.

4,881,523

ENDOSCOPE

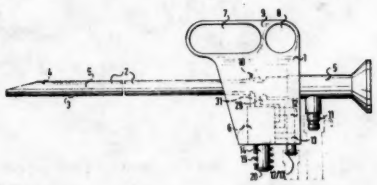
Helmut Heckele, Knittlingen, Fed. Rep. of Germany, assignor to Richard Wolf GmbH, Fed. Rep. of Germany

Filed Feb. 2, 1989, Ser. No. 305,165

Claims priority, application Fed. Rep. of Germany, Feb. 4, 1988, 3803212

Int. Cl.[4] A61B *1/12*

U.S. Cl. 128—4 **10 Claims**



1. An endoscope comprising a suction and flushing shaft provided with a suction and a flushing channel, a handle adapted to be coupled to said shaft and a switching valve accommodated in said handle and having switching positions for connecting the suction channel and the flushing channel to a suction sources and to a flushing fluid source, respectively, and for interrupting the connections of said channels to said sources, the switching valve having a further switching position for connecting said suction channel to said flushing fluid source.

4,881,524

INSTSRUMENT FOR GUIDING A LASER LIGHT TRANSMITTING FIBER

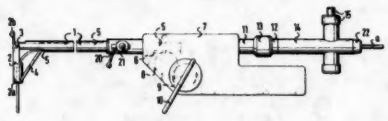
Maufred Boebel, Oetisheim, and Siegfried Hiltebrandt, Knittlingen, both of Fed. Rep. of Germany, assignors to Richard Wolf, GmbH, Fed. Rep. of Germany

Filed Jan. 26, 1989, Ser. No. 301,834

Claims priority, application Fed. Rep. of Germany, Jan. 27, 1988, 3802307

Int. Cl.[4] A61B *1/06*

U.S. Cl. 128—6 **18 Claims**



1. An instrument for guiding a laser light transmitting fiber in intraabdominal endoscopic work, the instrument comprising a shaft having a distal end and a proximal end and through which said fiber can be passed, a fiber guide deflectably pivoted to said distal end for angularly deflecting an end portion of said fiber projecting from said distal end, and a thrust device for deflecting said fiber guide; said thrust device comprising a fiber guide drive tube extending through said shaft and through which said fiber can be passed to extend up to a proximal end of said fiber guide, a link articulating said fiber guide to said tube, and a lever for displacing said tube axially of said shaft, said instrument further comprising a proximally positioned handle carrying said lever, and a fiber feed device arranged proximally of said tube and having a fiber feed member mounted for limited movement axially of said shaft and being provided with a device for releasably clamping said fiber.

4,881,525

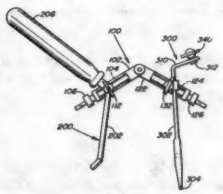
CERVICAL FUSION RETRACTOR

Richard C. Williams, 55 Highland Dr., San Luis Obispo, Calif. 93401

Continuation-in-part of Ser. No. 50,150, May 14, 1987, abandoned. This application Sep. 9, 1988, Ser. No. 242,634

Int. Cl.[4] A61B *17/02*

U.S. Cl. 128—20 **3 Claims**



1. A tissue retractor for cervical fusion surgical procedures comprising, in combination:

(a) a pair of elongat retractor mounting members each having a proximal and a distal end;

(b) means connecting the proximal ends of the respective retractor mounting members pivotally together to permit relative articulation between such members and to clamp such members at any selected angle relative to each other;

(c) retractor securing means; and

(d) means mounting the retractor securing means on the respective retractor mounting members for movement reciprocally along the length of the retractor mounting members and positioning the rectractor securing means at a selected point thereupon; and

(e) first and second retractors secured by the respective retractor securing means to the respective retractor mounting members, the first retractor comprising a blade and handle, the second retractor comprising a pair of elongate retractor arms pivotally connected together proximate the idstal end and forming oppositely facing hooks on the distal end for engaging and retracting muscle during use.

4,881,526

INTRAVAGINAL ELECTRODE AND STIMULATION SYSTEM FOR CONTROLLING FEMALE URINARY INCONTINENCE

Michael T. V. Johnson, Minneapolis, and Donald D. Maurer, Anoka, both of Minn., assignors to Empi, Inc., St. Paul, Minn.

Filed May 27, 1988, Ser. No. 200,037

Int. Cl.[4] A61H *21/00*; A61N *1/05, 1/36*

U.S. Cl. 128—24.5 **29 Claims**

1. An intravaginal electrode assembly including:

an elongated and generally cylindrical carrier having a tip at a distal end and an extended lip at a proximal end;

a pair of motor electrodes positioned adjacent one another on an exterior surface of the elongated carrier between the tip and lip approximately eight centimeters from the lip;

sensory stimulation means for stimulating sensory receptors mounted to the carrier adjacent the lip;

motor electrode terminal means coupled to the pair of motor

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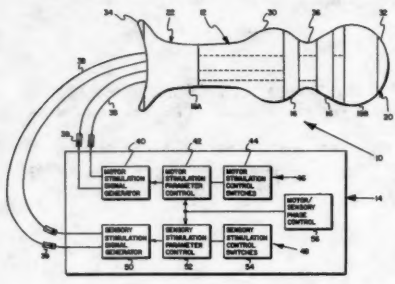
electrodes, for receiving motor receptor electrical stimulation signals; and



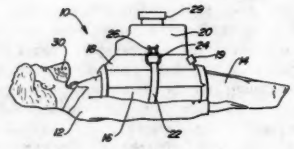
sensory stimulation terminal means coupled to the sensory stimulation means, for receiving sensory receptor stimulation signals.

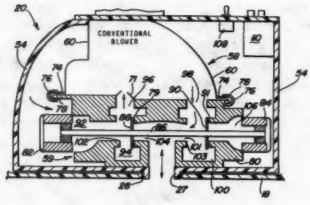
4,881,527

CARDIAC ASSIST CUIRASS

Samuel I. Lerman, 8552 Canton Center Rd., Canton, Mich. 48187

Filed Nov. 14, 1988, Ser. No. 271,585
Int. Cl.[4] A61H *31/02*
U.S. Cl. 128—30.2 **15 Claims**





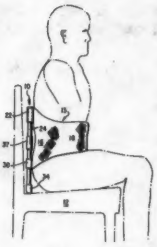
1. A method of cardiac assist comprising the steps of:
mounting a shell about a patient's torso;
sealing the shell with the patient's torso;
mounting a control and power mechanism on top of the shell that is readily attachable thereto and supported thereby which provides alternating connection of suction and pressure to a chamber within the shell to alternate squeezing and expansion of a patient's torso;
communicating the pressure and suction directly into said chamber such that said control unit cycles quickly and has almost instantaneous response to control unit signals to shift from suction to pressure;
placing a restrictor over the patient's mouth and nose that restricts the flow of air into the patient's body;
controlling the frequency of connection of pressure into the shell such that it approximates a patient's heartbeat and controlling the pressure of the discharge air entering the shell such that it approximates a patient's blood pressure.

4,881,528

SPINAL TRACTION AND SUPPORT UNIT USED WHILE SEATED

Henry Scott, 1109 Rock Creek Dr., Wyncote, Pa. 19095

Filed Oct. 21, 1988, Ser. No. 260,755
Int. Cl.[4] A61F *5/04*
U.S. Cl. 128—75 **7 Claims**



1. A sedentary traction and support device for supporting the lumbosacral spine of a patient while the patient is in a sitting position on a seat or the like without preventing the patient from attaining on upright position while wearing the device, the device comprising:
a girdle having an upper edge and a lower edge and a back panel portion defined between first and second wrap panels wherein the wrap panels engage the sides and front of the patient and the back panel portion engages only the back of the patient, the wrap panels having an upper edge and a lower edge with at least the upper edge of the wrap panels converging toward the lower edges of the wrap panels; wherein the wrap panels, when fastened around a patient, position the upper edge at the girdle beneath the patient's scapulae and press on the patient's abdomen to provide supplemental support for the patient's spine;
rigid support mounting means on the back panel of the girdle in proximity with the upper edge and the lower edge thereof;
rigid vertical support means, having rigid horizontal bracking means extending therebetween at a location beneath the lower edge of the girdle, secured to the rigid support mounting means and extending downwardly from the mounting means for engagement with an upper surface of the seat upon which the patient is sitting so as to provide support for the patient's lumbosacral spine.

4,881,529

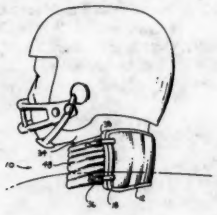
NECK SUPPORT COLLAR

Richard Santos, 21 Bird St., Apt. 1, Foxboro, Mass. 02035

Filed Aug. 10, 1988, Ser. No. 230,365
Int. Cl.[4] A61F *5/01, 5/04;* A61H *1/02*
U.S. Cl. 128—75 **12 Claims**

12. A neck support collar, comprising:
a generally rectangular elongated central section formed by a plurality of parallel adjacent tubes;
a first group of said plurality of tubes disposed adjacent a first longitudinal side edge of said central section, formed by three flexible plastic tubes, each having a diameter of one inch and a central longitudinal bore of one-fourth inch diameter;
a second group of said plurality of tubes disposed adjacent a second longitudinal side edge of said central section, formed by three flexible plastic tubes, each having a diam-

eter of one half inch and a central longitudinal bore of one-eighth inch diameter;
each of said plurality of tubes having an outer tubular wrapping of a perforated leather material;
a longitudinal seam sewn in said leather material between each pair of adjacent tubes;
an arcuate recess formed at a midpoint in said second longitudinal side edge, said recess extending laterally through an outer one and partially through a next adjacent one of said second group of tubes;
said recess lined with a soft leather material;
a pair of spaced buckle fasteners at a first end of said central section;
a generally rectangular end pad attached to said first end of said central section;



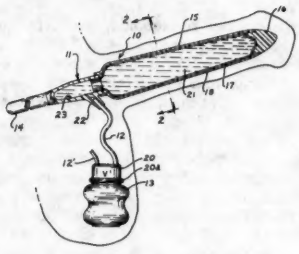
said end pad formed from a soft perforated leather sewn to said central section, a first outer side of said end pad having a plurality of diagonally extending first hook and loop fastening strips;
a generally rectangular support pad attached to a second end of said central section, opposite said first end;
said support pad having an interior rubber pad enclosed within a leather covering;
said support pad having a plurality of parallel spaced seams which subdivide the support pad into a plurality of adjacent sections which extend transversely to said plurality of tubes;
a back side of said support pad provided with second hook and loop fastening strips for cooperation with said first hook and loop fastening strips; and
a pair of fastening straps extending from a free end of said support pad for cooperation with said buckle fasteners.

4,881,530

PENILE PROSTHESIS

Robert E. Trick, Racine, Wis., assignor to Medical Engineering Corporation, Racine, Wis.

Continuation-in-part of Ser. No. 145,629, Jan. 19, 1988. This application Oct. 7, 1988, Ser. No. 254,976
Int. Cl.[4] A61F *2/26*
U.S. Cl. 128—79 **5 Claims**



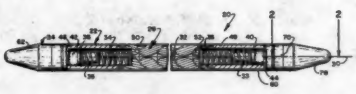
1. A penile prosthesis comprising at least one elongated, flexible cylindrical implant to be implanted in the pendulous penis, said implant containing a non-distensible inflatable bladder; pump means to be implanted in the scrotum for inflating said bladder with fluid; tubing connecting the pump means to the bladder; valve means for retaining fluid in the bladder; and, a retracting member positioned about said bladder, said retracting member being of an elastic material and smaller than the bladder so that when the bladder is inflated with fluid the retracting member is stretched and will exert pressure upon the bladder so that when the valve is opened and the bladder is permitted to empty, the retracting member will automatically force fluid out of the bladder.

4,881,531

POSITION STABLE SEGMENTED COLUMN PENILE PROSTHESIS

Gerald W. Timm, Woodland, and Stephen K. Sundquist, Chanhassen, both of Minn., assignors to Dacomed Corporation, Minneapolis, Minn.

Continuation of Ser. No. 934,245, Nov. 21, 1986, abandoned. This application Apr. 27, 1989, Ser. No. 346,386
Int. Cl.[4] A61F *2/26*
U.S. Cl. 128—79 **26 Claims**



1. A penile prosthesis having a range of motion between a concealed position and an erect position, comprising:
(a) an elongated body having a longitudinal axis and further having first and second end portions interconnected by an intermediate portion, the elongated body including an outer sheath of physiologically inert and pliable material;
(b) the intermediate portion including an articulated column of segments disposed intermediate of the first and second end portions of the elongated body, adjacent ones of the segments cooperating to form joints therebetween; and
(c) friction causing means cooperating with the segments for causing frictional contact between the segments at the joints, the frictional contact resulting in a frictional force sufficient to provide the prosthesis with positional stability throughout its range of motion, whereby the prosthesis will remain in any position where placed throughout its range of motion, the friction causing means including tension means for forcing adjacent ones of the segments into frictional contact with one another, the tension means including spring means disposed in at least one of the end portions, the intermediate portion having substantially uniform predetermined flexibility along its entire extent.

4,881,532

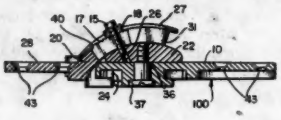
ORTHOPEDIC HIP HINGE PROVIDING ADJUSTMENT FOR ABDUCTION

Donald A. Borig, 44 Pine Dr., Chester Springs, Pa. 00000; Godfrey Harris, 10676 W. Turfts Pl., Littleton, Colo. 00000, and Gary P. Korngold, 3435 Fayance Pl., Thousand Oaks, Calif. 00000

Filed Jul. 30, 1987, Ser. No. 79,761
Int. Cl.[4] A61F *5/00*
U.S. Cl. 128—80 A **4 Claims**

1. An orthopedic device of the kind suitable for hip casts and orthoses, comprising:
(a) an upper arm for attaching said device to a location on a patient's waist;
(b) pivot head means rotatably affixed to said upper arm for rotation about an axis alignable with the femoral head of such patient, said pivot head means having an outwardly-facing convex surface;

(c) a lower arm for attaching said device to a location alongside a patient's thigh, said lower arm having a sleeve portion with an inwardly-facing concave surface slidably receiving said convex surface of said pivot head means for abductive and adductive movement of said lower arm;



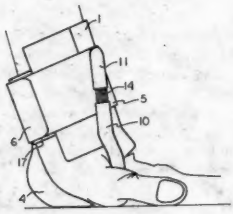
(d) said sleeve portion having a slot therein and said pivot head means being provided with control means secured thereto and extending through said slot for retaining said concave surface against said convex surface and for limiting the extent of said abductive and adductive movement.

4,881,533

VARIANCE WRIST BRACE

Luc Teurlings, 711 Wilcox Ave., #304, Los Angeles, Calif. 90038

Filed Mar. 3, 1988, Ser. No. 163,869
Int. Cl.[4] A61F *5/04, 13/00;* **A41D** *13/08;* **A63D** *5/00*
U.S. Cl. 128—87 R **8 Claims**



1. A wrist supporting device for gymnasts comprising, in combination, a dorsal body of flexible sheet material positioned to contour the back of the user's wrist and lower one third of said user's metacarpal bones,

said dorsal body having three pockets whereof two lateral pockets are positioned on each side of said user's wrist, each containing a pad of resilient material,

said dorsal body having a central pocket, enclosing a thick malleable support member of said resilient material, reinforced by a more rigid support member positioned on the free surface of said malleable support member and said rigid support member having a longitudinal dimension shorter on the distal end than said malleable support member,

said central pocket covering substantially the width of said user's wrist and said lower third of said metacarpals and being elongated more towards distal margin than said lateral pockets when said dorsal body is wrapped around said user's wrist, and means for wrapping said dorsal body around said wrist whereby a wrist strap is secured to said dorsal body, encircling said wrist, then looping through a ring attached to the beginning of said wriststrap, tightly pulled in reverse direction by said user to secure a loose end to removably adhering material on said beginning of said wriststrap, and a palmar body of said flexible sheet material which is sized and shaped to cover the front side of both said wrist and lower half of palm below proximal creaseline, thus covering said thumbside of said palm more distally than the covering of said little finger side of said palm, attachment means of said palmar body attaching said wriststrap on front of said wrist and using a long palmar strap emerging from said free edge of said thumbside wrapping around said thumb adhering to backside of said wriststrap, a short palmar strap emerging from distal end on said little finger side of said palmar body, wrapping around side of said hand adhering to backside of said wriststrap, and a palmer pad of said resilient material encased in said palmar body covering and cushioning lower portion of said palm, wherein upper edge of said palmer pad coincides with upper edge of said palmar body, and lower edge of said palmar pad extends only as far as the lower edge of said palm.

4,881,534

CORTICOTOMO OSTEOTOME WITH T-SHAPED CUTTING END

Richard L. Uhl, 36 Hawthorne Pl., Montclair, N.J. 07042, and Robert J. Uhl, 29 Lake Dr., E., Wayne, N.J. 07470

Filed Oct. 3, 1988, Ser. No. 252,666
Int. Cl.[4] A61B *17/32*
U.S. Cl. 606—84 **6 Claims**

1. A corticotomy osteotome comprising an elongated body having a cutting end an an anvil end adapted for engagement with a mallet in advancing the cutting end, wherein the cutting end is of T-shaped cross-sectional form with the cross-head of the T providing closely spaced and essentially parallel inner and outer bearing surfaces for engaging respectively the outer surface of the cortex, and the inner surface of the periosteum, and a rib extending perpendicularly and centrally of the inner bearing surface a distance approximately equivalent to the thickness of the bone cortex, the rib having closely spaced parallel surfaces terminating in a tapered cutting edge extending perpendicularly to said inner bearing surface, and being spaced inwardly from the leading edge of said inner bearing surface, and the outer bearing surface being smoothly rounded along its edges and tapered in the direction of said leading edge of the inner bearing surface permitting the leading edge to lift the periosteum from the bone cortex, and support it in spaced relation to the cortex, as the osteotome is advanced to cut the cortex, and the anvil end having means engagable by a transverse member providing leverage for axial twisting of the osteotome at the end of a cortex cutting operation to facilitate enlargement of the cut made in the cortex.

4,881,535

INTRAMEDULLARY ROD TARGETING DEVICE

Gary W. Sohngen, 2101 Paseo Del Mar, San Pedro, Calif. 90732

Filed Sep. 6, 1988, Ser. No. 240,937
Int. Cl.[4] A61B *17/56*
U.S. Cl. 606—98 **7 Claims**

1. An intramedullary rod targeting device for guiding drilling of distal fastener screw passages in the femur of a patient during the installation in the patient's femur of an intramedullary rod which comprises at least one fastener screw receiving aperture therethrough proximate the distal end thereof, comprising:

a rigid external support member adapted to reside outside the patient generally parallel to and along the patient's femur during installation of an intramedullary rod in the patient's femur, the external support member comprising an elongate channel support member comprising a web portion and edge flange portions, the web portion having formed therein connector screw apertures and alignment pin apertures;

means for removably mounting the proximal end of said intramedullary rod to and spaced from the proximal end

of the external support member positioning the intramedullary rod generally parallel to the external support member with the axes of the fastener screw apertures in a predetermined relationship with respect to the rigid external support member, said means for mounting the proximal end of the intramedullary rod including an alignment pin for being received in an alignment pin aperture in the rigid external support member for accommodating specific intramedullary rods of specific lengths;

trochar alignment means movably mounted proximate the distal end of the external support member for being

aligned with the axes of the fastener screw apertures through the intramedullary rod, the alignment pin and the corresponding alignment pin aperture being so positioned that for a specific intramedullary rod the trochar alignment means is aligned longitudinally with the fastener screw apertures; and

means for adjusting the position and orientation of the trochar alignment means for guiding drills in the drilling of said fastener screw passages in the femur in alignment with the apertures through the distal end of the intramedullary rod.

4,881,536

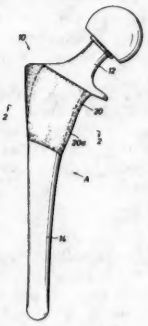
METHOD AND APPARATUS FOR PROSTHESIS PLACEMENT

Phillip C. Noble, 2601 S. Braeswood, Apt. 103, Houston, Tex. 77025, and Hugh S. Tullos, 2151 Troon, Houston, Tex. 77019

Filed Jan. 22, 1987, Ser. No. 6,563

Int. Cl.[4] A61F *1/04*

U.S. Cl. 606—94 **7 Claims**



1. A method of preparing a prosthesis for subsequent securing within a surgically prepared opening in a patient's bone using plastic bone cement, including the steps of:

bonding to the prosthesis a shaped layer of plastic bone cement comparable material of sufficient annular thickness to form sealing collar means for operably effecting a pressurizing seal with the anticipated size of the bone opening during the final increment of movement of the prosthesis during insertion into the surgically prepared bone opening for securing and;

curing the layer of bone cement compatible material under controlled pressurized conditions to obtain a desired minimum level of mechanical properties of the bone cement compatible material prior to securing the prosthesis within the prepared opening.

4,881,537

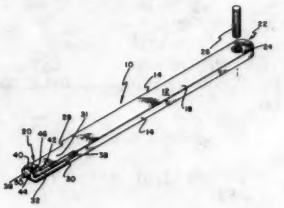
SURGICAL INSTRUMENT, AND METHODS FOR FORMING A CHANNEL IN A FEMORAL CONDYLE INCLUDING RECONSTRUCTING AN ANTERIOR CRUCIATE LIGAMENT

Charles Henning, 7401 Pagent, Wichita, Kans. 67206

Filed Aug. 10, 1988, Ser. No. 232,427

Int. Cl.[4] A61B *17/16, 17/56*

U.S. Cl. 606—84 **19 Claims**



1. A surgical instrument comprising a shank means having a pair of shank sides, a shank back and a shank front and a cutting end means and a handle end means; said cutting end means having a pair of grooves in said shank front and along said pair of shank sides such that said cutting end means has a structure defining a pair of opposed flanges; said shank back having a back channel; a first cutting member secured on said shank front at said cutting end means; and a second cutting member superimposed on said first cutting member and secured thereto.

4,881,538

RESPIRATOR AIR GUIDE

Cyril N. E. Angell, Trowbridge, England, assignor to Avon Industrial Polymers Limited, Melksham, England

Continuation of Ser. No. 773,186, Sep. 6, 1985, abandoned, which is a continuation of Ser. No. 469,894, Feb. 25, 1983, abandoned. This application Aug. 7, 1986, Ser. No. 894,087

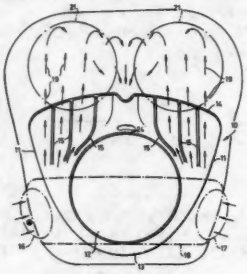
Claims priority, application United Kingdom, Feb. 26, 1982, 8205716

Int. Cl.[4] A62B *18/08*

U.S. Cl. 128—201.15 **13 Claims**

1. A respirator with a face-piece having an air inlet located asymmetrically relative to a line of said face-piece which is in the median plane of the face of the user, in use, and an air guide connected to said face-piece so as to be positioned, in use, between the air inlet and the face of the user and oriented so as to have its upper edge near but below the eyes of a user, with ridges extending between the face-piece and the air guide and toward the upper edge of the air guide to act as guide vanes

and to define channels for directing and improving symmetry of air flow, relative to the median plane, from the asymmetrical



air inlet along the surface of the air guide adjacent said facepiece.

4,881,539

PROTECTIVE SUIT HAVING A SUPPLY OF BREATHING AIR

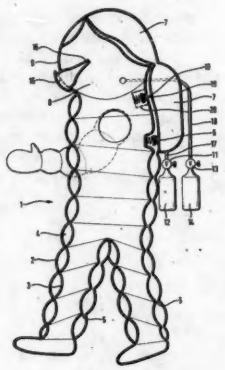
Adalbert Pasternack, Bad Schwartau, Fed. Rep. of Germany, assignor to Drägerwerk Aktiengesellschaft, Lübeck, Fed. Rep. of Germany

Filed Mar. 27, 1987, Ser. No. 31,938

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1986, 3610491

Int. Cl.[4] B63C *11/02*; A62B *17/00, 7/00*

U.S. Cl. 128—201.27 **6 Claims**



1. A protective suit comprising:

a helmet portion having head and neck regions adapted to enclose the entire head and neck of a wearer;

a body portion adapted to enclose the body of the wearer therein, said body portion being connected to said helmet portion and comprising a plurality of hollow chambers fillable with breathing gas and adapted to surround the body of the wearer of the suit, said hollow chambers having respective hollow interiors and being interconnected to cause said interiors of said hollow chambers to communicate one with the other;

a plurality of hollow bodies fillable with breathing gas and being arranged on said suit in the head, neck and upper torso regions thereof;

said hollow bodies having respective hollow interiors and being interconnected so as to cause said hollow interiors to communicate one with the other;

breathing gas supply means connected to said hollow bodies for supplying breathing gas thereto;

first pretensioned transition means interposed between said hollow bodies and said hollow chambers for permitting breathing gas to pass from said hollow bodies to said hollow chambers;

second pretensioned transition means interposed between said hollow chambers and the interior of said helmet portion for permitting breathing gas to pass from said hollow chambers to said interior of said helmet portion; and,

said first pretensioned transition means being configured to open in response to a first pressure of the breathing gas and said second pretensioned transition means being configured to open in response to a second pressure of the breathing gas, said first pressure being less than said second pressure.

4,881,540

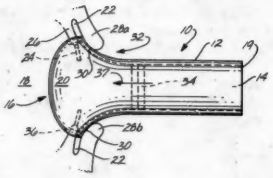
DEVICE AND METHOD FOR ASSISTING IN ARTIFICIAL RESPIRATION

Larry P. Vigilia, 341 Harvey Dr., #1, Glendale, Calif. 91206

Filed Feb. 5, 1988, Ser. No. 152,651

Int. Cl.[4] A61M *16/00*

U.S. Cl. 128—202.28 **7 Claims**



1. A device to assist in providing artificial respiration to a person comprising:

a conduit defining an airway to pass air into the mouth and lungs of the person, said conduit having a first end to be received in the person's mouth and an open second end to receive respiring air;

a flange portion extending outwardly from the conduit to be received into the person's mouth between the gums and lips, said flange portion defining a surface adapted to seal the device against the inside surface of the lips about the mouth,

means to induce a seal between the flange and the inside of a person's lips without conscious cooperation of the person, said means including means for urging the flange portion against the inside surface of the lips, and

means for preventing reverse flow of air from said person through the conduit.

4,881,541

VAPORIZER FOR AN ANESTHETIC HAVING A VAPOR PRESSURE ABOUT ONE ATMOSPHERE

Edmond I. Eger, II, San Francisco, and Brynte H. Johnson, San Ramon, both of Calif., assignors to The Regents of the University of California, Oakland, Calif.

Filed Dec. 21, 1988, Ser. No. 287,721

Int. Cl.[4] A61M *15/00*

U.S. Cl. 128—203.25 **20 Claims**

1. An apparatus for mixing a volatile anesthetic, having a vapor pressue of about 760 mm of mercury at about 20° C., into a effective anesthetic/diluent gas mixture to be supplied to a patient, useful to monitor the flow rate of volatilized anesthetic, the flow rate of diluent gas and the anesthetic/diluent

gas mixture ratio at an effective anesthetic concentration, which apparatus comprises:

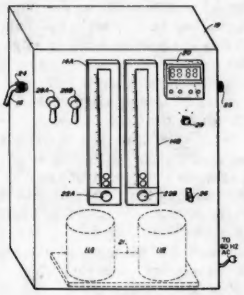
(a) a housing effective to thermally insulate the interior of the apparatus from the operating room environment;

(b) a diluent gas supply;

(c) an anesthetic gas supply located within the space created by the housing;

(d) a mixing chamber within the space created by the housing which has

(i) an inlet conduit, for a diluent gas supply which is external to the housing and a flowmeter, within or without the space created by the housing between the diluent gas supply and the mixing chamber;



(ii) an inlet conduit, for an anesthetic gas supply which is located within the housing and a flowmeter both within the space created by the housing, between the anesthetic gas supply and the mixing chamber; and

(iii) an outlet conduit within the space created by the housing to deliver the anesthetic plus diluent gas mixture to the patient;

(e) at least one heating means to maintain the constant temperature of the components within the space created by the housing of between about 30° and 50° C. within plus or minus 1° C., and

(f) at least one sensing means within the space created by the housing to accurately monitor and maintain the internal temperature of the space enclosed by the housing.

4,881,542

TUBULAR FLEXIBLE PROBE FOR INTRODUCTION INTO THE TRACHEA AND, RESPECTIVELY, INTO THE BRONCHIAL SYSTEM

Christoph Schmidt, Am Kumpel 12, 5300 Bonn 1; Rudolf Schon, Im Spichelsfeld 34, 5205 St. Augustin, and Jurgen Rucs, Rosental 32, 5300 Bonn 1, all of Fed. Rep. of Germany

Filed Mar. 18, 1987, Ser. No. 27,432

Claims priority, application Fed. Rep. of Germany, Mar. 18, 1986, 3608943; PCT Int'l Appl., Jul. 10, 1986, DE86/00283

Int. Cl.[4] A61M *16/00*

U.S. Cl. 128—207.14 **14 Claims**

1. A tubular flexible probe said probe comprising a unitary body means for introduction into the trachea and, respectively, into the bronchial system having a longitudinal axis, a proximal end, a distal end and an outer wall, said outer wall defining a cylindrical portion at the distal end extending to and integrally joined with a conically flared portion at the proximal end, said body means being made of a synthetic resin and containing a continuous first lumen means for suctioning and a continuous second lumen means for administration of fluid media having a smaller diameter than the first lumen means, said unitary body means further including an inner partition wall separating the first lumen means and said second lumen means the outer wall of the body means having a recess extending through said outer wall into the second lumen means, said recess being adjacent to the proximal end of the body means; an elastic connecting hose having two ends, one of the ends defining an inlet and the other end being inserted via said recess into the second lumen means and joined thereto; said first lumen means and said second lumen means extending from the proximal end of the body means to at least a zone adjacent to the distal end of the body means in side-by-side relationship and in parallel to the longitudinal axis of the body means and at least the first lumen means terminating at the distal end of the body means; and the exterior of the distal end of the body means having a round configured means whereby introduction of fluid media into the second lumen means and suctioning of fluids including secretions through the first lumen means can be effected alternatingly and whereby a high exit velocity of the fluid media introduced into the second lumen means is provided at the distal end of the body means; said probe having the following characteristic features:

(a) the body means has a length of about 30–55 cm,

(b) the outer wall of the body means has a diameter of about 5–8 mm,

(c) the first lumen means has an inner diameter of about 3–4.5 mm,

(d) the second lumen means has an inner diameter of about 1 to maximally 2 mm, and

(e) attachment means at the inlet end of the connecting hose providing a fitting for a syringe.

4,881,543

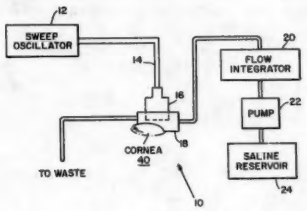
COMBINED MICROWAVE HEATING AND SURFACE COOLING OF THE CORNEA

B. Stuart Trembly, Hanover, N.H., and Ralph E. Crump, Turnbull, Conn., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Jun. 28, 1988, Ser. No. 212,506

Int. Cl.[4] A61B *17/36*; A61N *5/02*

U.S. Cl. 128—303.1 **16 Claims**



1. An applicator for selectively heating portions of the eye comprising:

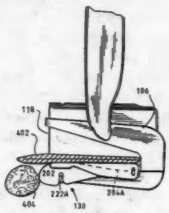
(a) an antenna means for radiating microwave energy in a pattern to apply a portion of said energy at a predetermined depth within the cornea to elevate the temperature of the cornea tissue at said depth to shrink such tissue; and

(b) cooling means for flowing fluid over the outer surface of the cornea to prevent excessive temperature elevation of the cornea surface tissue during radiation of said microwave energy.

4,881,544
SURGICAL STAPLER APPARATUS WITH IMPROVED TISSUE SHIELD

David T. Green, Westport, and Ernest Aranyi, Easton, both of Conn., assignors to United States Surgical Corporation, Norwalk, Conn.

Filed Dec. 19, 1988, Ser. No. 286,507
Int. Cl.[4] A61B *17/04;* B31B *1/00*
U.S. Cl. 227—178 20 Claims



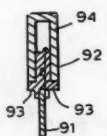
1. In an improved surgical stapler for substantially simultaneously applying a plurality of surgical fasteners to body tissue comprising a handle, a gripping lever, a frame with a U-shaped distal portion, an anvil assembly mounted at the distal leg of the U-shaped distal portion, a fastener holder pivotally connected to the anvil assembly adjacent one end of the anvil assembly thereby defining a gap between them and containing a plurality of surgical fasteners and optionally including a knife means for cutting body tissue, the stapler mechanism further including a fastener driving means for substantially simultaneously driving all of the fasteners from the fastener holder, and means for actuating the fastener holder, the improvement comprising:

shield assembly means mounted on the sides of the anvil assembly for preventing extraneous body tissue from being operated upon the surgical stapler, said shield assembly means comprising a wedge member for separating the extraneous tissue from the body tissue to be fastened and two shutter blades acting in cooperation with the wedge member for deflecting the extraneous tissue from entering the gap between the anvil assembly and the fastener holder.

4,881,545
SURGICAL FASTENER CARTRIDGE WITH IMPROVED BODY TISSUE CUTTING KNIFE ASSEMBLY

Jack L. Isaacs, Trumbull, Conn., and Boris Zvenyatsky, Bronx, N.Y., assignors to United States Surgical Corporation, Norwalk, Conn.

Filed Dec. 8, 1988, Ser. No. 281,552
Int. Cl.[4] A61B *17/04*
U.S. Cl. 227—178 10 Claims



1. In a surgical fastener cartridge which is adapted for use with an actuator apparatus having a rigid frame and a generally U-shaped protion for receiving the fastener cartridge, the actuator apparatus actuating the fastener cartridge to apply substantially parallel rows of fasteners to the tissue on both sides of a line of incision formed by a body tissue cutting knife assembly included within the fastener cartridge, said fastener cartridge possessing:

(a) a fastener holder containing a quantity of fasteners, the fasteners being driven, upon actuation of the fastener cartridge, through substantially parallel rows of apertures defined upon a fastener ejecting surface of the fastener holder;

(b) an anvil having a surface opposed to the fastener ejecting surface of the fastener holder and, upon actuation of the fastener cartridge, cooperating therewith to apply substantially parallel rows of fasteners to body tissue positioned between thef astener holder and anvil;

(c) means for driving the fasteners through the apertures upon actuation of the fastener cartridge;

(d) a tissue cutting knife assembly including (i) a knife element having an upper non-cutting edge and a lower cutting edge, (ii) a knife holder engaging the upper edge of the knife element and (iii) a knife pusher enclosing the knife holder, the cutting edge of the knife element being recessed within the fastener holder in the non-actuated condition of the fastener cartridge and, upon actuation of the fastener cartridge, extending beyond a slot formed between the rows of apertures; and,

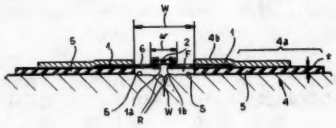
(e) means for driving the cutting edge of the knife assembly through the slot upon actuation of the fastener cartridge,

the improvement which comprises a knife holder having two opposed sides defining at their lower sections a groove therebetween, the knife element being received into, and held in permanent and irreversible locking engagement with, the groove.

4,881,546
WOUND-CLOSURE DEVICE AND METHOD

Hans-Jürgen Kaessmann, Norden, Fed. Rep. of Germany, assignor to Opti-Patents-, Forschungs-und Fabrikations-AG, Riedern-Allmeind, Switzerland

Filed Dec. 16, 1987, Ser. No. 133,554
Claims priority, application Fed. Rep. of Germany, Dec. 16, 1986, 3642892; Feb. 28, 1987, 3706599
Int. Cl.[4] A61B *17/08, 17/04;* A44B *19/00*
U.S. Cl. 128—335 25 Claims



1. A device for closing a wound in the body of a subject, especially a linear surgical incision, comprising:

a pair of low-extensibility garment-type flexible textile support tapes having juxtaposed inner edges;

respective continuous flexible garment-type slide-fastener coupling elements affixed to said tapes along said edges and having mutually interdigitatable coupling heads composed of polyester or polyamide and compression and buckling resistant when coupled together;

a slider shiftable along said coupling elements for selectively interdigitating the coupling heads of said coupling elements to couple said elements together and separating said coupling elements;

a respective spacer strip fixed on a surface of each tape, said surface facing toward said body and said strip spaced from the respective coupling element for holding said coupling elements away from said wound; and

means for adhesively bonding said tapes to said body on opposite sides of said wound with said spacer strips interposed between said tapes and said body, said means including an adhesive layer having a hypoallergenic adhe-

sive facing toward and contacting said body, and at least one adhesive strip overlapping each of said tapes and having a portion projecting beyond an outer edge of the respective tape opposite the respective inner edge, the widths of said adhesive strips including the projecting portions thereof being at least sufficient to enable the bond between said tapes and said body to withstand the wound-closing force between opposite sides of the wound.

4,881,547

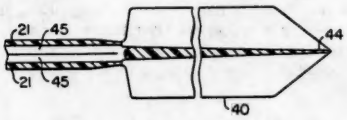
ANGIOPLASTY DILITATION BALLOON CATHETER

John W. Danforth, 875 25th Ave., San Francisco, Calif. 94121

Continuation-in-part of Ser. No. 91,689, Aug. 31, 1987, abandoned. This application Sep. 1, 1988, Ser. No. 239,061

Int. Cl.[4] A61M *29/02*

U.S. Cl. 128—344 **33 Claims**



1. A catheter comprising:

a guidewire extending from a proximal end to a distal end;

an inflatable dilitation balloon having a wall defining the interior of the balloon and with at least a portion of said balloon wrapped around a portion of the guidewire proximate the distal end of the guidewire without any portion of said guidewire being in said interior of said balloon; and

means for inflating the balloon.

4,881,548

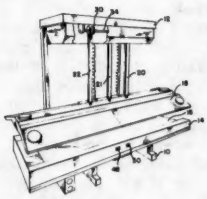
TANNING BED TOP COVER ACTUATOR

Donald D. Kramer, Yakima, Wash., assignor to Circle K Enterprises, Inc., Yakima, Wash.

Filed Feb. 10, 1987, Ser. No. 12,844

Int. Cl.[4] A61N *5/06*

U.S. Cl. 128—376 **7 Claims**



1. A tanning bed and an apparatus for supporting, raising and lowering a top cover of said tanning bed, comprising:

a frame having an upper support structure supporting a top member;

a bottom member on which a user reclines while in said tanning bed, said bottom member having a plurality of ultraviolet lights and being connected to said frame and located directly below said top member;

a rotatable axle coupled to said frame at an upper region;

a motor coupled to said axle for rotating said axle to lower or raise said top member;

a plurality of reels attached to said axle said plurality of reels including a plurality of reels fixedly attached to said axle and a variable position reel;

a plurality of flexible first support straps coupled to said fixed reels at one end thereof and to said top member at another end thereof, all of said first support straps being the same length;

a flexible second support strap coupled at one end thereof to said variable position reel means, said variable position reel means capable of being fixed to said axle at a plurality of angular positions and to said top member at another end thereof, said second support strap being of a length longer than said first support straps, said first and second support straps being of such a length that if fully extended from said axle and coupled to said top member, permitting said top member to be in the lowest possible position, said top member is positioned a predetermined distance above said bottom member, said predetermined distance being greater than the expected size of a user's body when said user is reclined on said bottom member; and

a locking member means for locking said variable position reel means in a desired fixed position on said axle, said second support strap being coupled to said variable position reel.

4,881,549

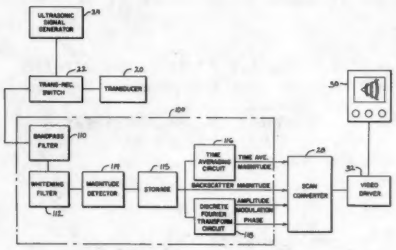
APPARATUS AND METHOD FOR OBTAINING ULTRASONIC BACKCATTER MEASUREMENT FROM TISSUE

Theodore L. Rhyne, Whitefish Bay, Wis., assignor to Marquette Electronics, Milwaukee, Wis.

Continuation of Ser. No. 55,732, May 29, 1987, abandoned. This application Jul. 14, 1988, Ser. No. 219,895

Int. Cl.[4] A61B *8/00*

U.S. Cl. 128—660.07 **60 Claims**



1. Apparatus for obtaining an optimal measurement of the absolute magnitude of the ultrasonic backscatter from a selected tissue region in a body of tissue, the tissue of the region forming distributed, unresolved ultrasonic reflectors, said apparatus being couplable to means for applying a transmitted ultrasonic signal to the body exteriorly thereof and for receiving a signal having spectral components of frequency at the exterior of the body, said received signal including the backscatter signal from the tissue region, said apparatus comprising:

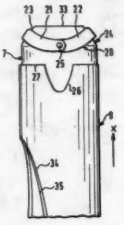
means for signal processing the backscatter signal form the region for compensating the backscatter signal for the frequency spectrum alterations contained in the backscatter signal resulting from the frequency response characteristics of the apparatus and the signal transmitting/receiving means, the bulk tissue loss, and the tissue of the region to provide an output in which each spectral component is equally weighted; and

means coupled to said signal processing means for determining the power of the signal processing means output and providing an output of said power determining means being indicative of the absolute magnitude of the ultrasonic backscatter from the tissue of the region.

4,881,550
MEDICAL INSTRUMENT

Lutz Kothe, Bodmaner Str. 17, D-7760 Radolfzell 14, Fed. Rep. of Germany

Filed Feb. 16, 1988, Ser. No. 155,917
Claims priority, application Fed. Rep. of Germany, Feb. 18, 1987, 8702446[U]
Int. Cl.[4] A61B *17/32*
U.S. Cl. 128—752 21 Claims

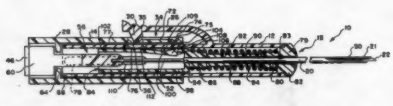


1. A medical instrument with cutting forceps for taking tissue samples and removing elongated body elements, such as nerve or vein portions or the like, which comprises: an outer tube; an inner tube inserted in said outer tube, with one of said tubes being axially displaceable relative to the other and with one of said tubes having a terminal edge with depressions; cutting forceps affixed to the other of said tubes, said cutting forceps having two cutting blades with cutting edges and common pivots affixed to the other of said tubes, wherein the closing movement of said forceps is caused by the depression acting upon said cutting forceps when said tubes are axially moved relative to each other, and wherein said pivots are introduced into said depressions on closing the cutting edges.

4,881,551
SOFT TISSUE CORE BIOPSY INSTRUMENT

Glenn N. Taylor, Longmont, Colo., assignor to Hart Enterprises, Inc., Wyoming, Mich.

Filed Feb. 1, 1988, Ser. No. 150,984
Int. Cl.[4] A61B *10/00*
U.S. Cl. 128—754 16 Claims



1. A soft tissue core biopsy instrument comprising: a proximal outer barrel member having a distal end and a proximal end;

a distal inner barrel member which is slidably received within said outer barrel member, which has a distal end and a proximal end and which has a stop in said distal end;

a cannula driver in said inner barrel member;

a cannula extending distally from said inner barrel member, being fixed to said cannula driver, and having a distal tip, said cannula driver being slidably received in and movable within said inner barrel member and said cannula extending a predetermined distance out of a distal end of said inner barrel member when the instrument is in ann at-rest condition;

a stylet having a distal end, a proximal end, and being removably received in said outer barrel, in said inner barrel, and in said cannula, said distal end having a biopsy sample receiving notch therein;

a stylet hub mounted to said proximal end of said stylet;

said stylet hub being removably attached to the proximal end of said proximal outer barrel member to enable multiple biopsies to be obtained with one insertion of said cannula, said stylet extending distally from said hub and within said cannula and having a distal tip portion (a) positioned within said cannula when the instrument is in an at-rest position and (b) extending distally of said distal tip of said cannula in position to capture a biopsy sample when the instrument is in a cocked condition;

biasing means within said inner barrel member between said stop and said cannula driver for biasing said cannula driver;

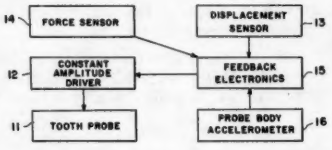
latching means associated with said cannula driver and said inner barrel member for latching said cannula driver in a proximally retracted cocked position within said outer barrel member and said inner barrel member against the biasing action of said biasing means;

and a trigger, associated with said latching means, for unlatching said latching means, said trigger, upon being actuated for unlatching of said latching means, allowing said biasing means to quickly return said cannula driver and said cannula to said distally extending position thereof and over said stylet distal tip portion.

4,881,552
TOOTH STABILITY MONITOR

Joseph S. Heyman, Williamsburg, Va., assignor to Measurement Resources Inc., Newport News, Va.

Filed Jan. 20, 1988, Ser. No. 146,288
Int. Cl.[4] A61B *5/10*
U.S. Cl. 128—774 6 Claims



1. A tooth stability monitor comprising:

means for sinusoidally moving the tooth under investigation at a small constant amplitude comprising a hand held tooth probe including a probe tip mounted in a probe mount for making contact with the tooth, a hand held probe body, and means for sinusoidally moving said probe mount relative to said hand held probe body;

means for generating a first electrical signal representing the resulting displacement of the tooth;

means for generating a second electrical signal representing the force applied to said tooth to produce the movement of the tooth;

means for generating a third electrical signal proportional to vibrations of said hand held probe body; and

means receiving said first, second and third electrical signals for modifying said first and second electrical signals to remove the effects of the hand held probe body vibrations, and for computing the tooth modulus using the modified first and second electrical signals.

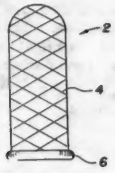
4,881,553
MESH REINFORCED CONDOM

Richard A. Grossman, 1620 Forest Ave., Durango, Colo. 81301

Filed Nov. 20, 1987, Ser. No. 123,587
Int. Cl.[4] A61F *13/00*
U.S. Cl. 128—844 18 Claims

1. An elastic mesh, in the size and shape of a condom, which

is useful for the production of a latex condom wherein all walls of the condom are reinforced, said mesh having an elasticity



about equal to the elasticity of latex of a condom and said mesh being open at its lower end and closed at its upper end.

4,881,554

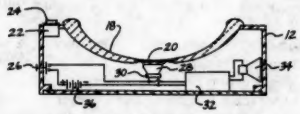
SMOKING HABIT BREAKER

Jackson Obasogie, 1251 NE. 108th St., #302, Miami, Fla. 33161

Filed Nov. 16, 1987, Ser. No. 121,278

Int. Cl.[4] A24F *19/10*

U.S. Cl. 137—270 **7 Claims**



1. A new and improved ashtray for helping smokers to break the smoking habit, comprising;

a hollows housing having an interior;

a concave ash receiving depression formed in a top surface of said housing;

a smoke passage centrally disposed in said depression, said passage communicating with the interior of said housing;

a smoke tunnel in said housing interior in registry with said smoke passage;

a smoke detector in said housing interior;

a fan in said tunnel for drawing smoke to said smoke detector;

auido means for playing a recorded audio anti-smoking verbal message in response to detection of smoke by said smoke detector;

a digital counter operatively connected for counting the number of activations of said smoke detector;

battery means operatively connected for powering said fan, said smoke detector, said audio means and said counter; and

a switch for selectively connecting said disconnecting said battery means.

4,881,555

SMOKING ARTICLES

Anthony J. N. Bolt, and John S. Sadd, both of Bristol, England, assignors to Imperial Tobacco Limited, Bristol, England

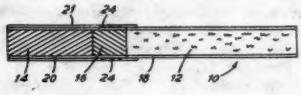
Filed Sep. 16, 1988, Ser. No. 245,646

Claims priority, application United Kingdom, Sep. 22, 1987, 8722309

Int. Cl.[4] A24D *1/00, 1/04*

U.S. Cl. 131—335 **12 Claims**

1. A smoking article comprising a rod of smoking material, a heat sensitive aroma-release element disposed adjacent an end of the smoking material, said heat sensitive aroma release element releasing the aroma into the ambient atmosphere when the burning smoking material reaches the vicinity of the element so that the aroma is relased only after substantially all the smoking material is combusted, said heat sensitive aroma release element being combustible and adapted to smoulder under the influence of heat from the burning smoking material.



4,881,556

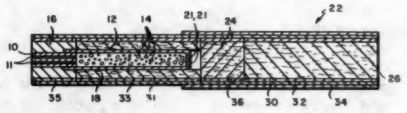
LOW CO SMOKING ARTICLE

Jack F. Clearman, Blakely, Ga.; Olivia P. Furin; Joseph J. Chiou, both of Clemmons, N.C., and William C. Squires, Winston-Salem, N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Jun. 6, 1988, Ser. No. 203,392

Int. Cl.[4] A24D *1/00*

U.S. Cl. 131—359 **17 Claims**



1. A smoking article comprising:

(a) a carbonaceous fuel element having a plurality of passageways therein, said fuel element having a diameter of less than about 7 mm and a length of less than about 7 mm; and

(b) a physically separate aerosol generating means including an aerosol forming material;

said smoking article providing no more than about 10 mg of carbon monoxide over 8 puffs under smoking conditions consisting of 35 ml puff volumes of two seconds duration separated by 58 seconds of smolder.

4,881,557

SMOKING ARTICLE WRAPPER AND METHOD OF MAKING SAME

Richard H. Martin, Brevard, N.C., assignor to P. H. Glatfelter Company, Spring Grove, Pa.

Filed Apr. 20, 1988, Ser. No. 183,979

Int. Cl.[4] A24D *1/02*

U.S. Cl. 131—365 **36 Claims**

1. A wrapper for smoking articles such as cigarettes, cigars and the like comprising a cellulosic fiber sheet containing, as filler, freshly precipitated magnesium hydroxide and particulate magnesium hydroxide applied to the fibers of the sheet.

4,881,558
ROTATABLE LIQUID HAIR TREATMENT MEDIUM APPLICATOR

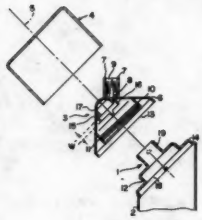
Detlef Hollenberg, Hilden; Hans Schneider, Schwalmtal, and Georg Weihrauch, Wald-Michelbach, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Jan. 26, 1988, Ser. No. 148,410

Claims priority, application Fed. Rep. of Germany, Jan. 26, 1987, 3702167

Int. Cl.[4] A45D *24/22*

U.S. Cl. 132—112 6 Claims



1. A rotatable liquid hair treatment medium applicator comprising:

a container for a liquid hair treatment medium, which is generally cylindrical and capable of being held in one hand, having an opening on its top extending outward perpendicularly from a container distal face, the plane of which face is angularly disposed with respect to the vertical axis of the container, which opening comprises a plurality of concentric rising annular steps of decreasing diameter;

an applicator head rotatably mounted upon the container opening concentrically with the container opening central axis, having a generally conical outer surface concentric with the container opening central axis, and one or more descending interior cylindrical appendages concentric with the opening central axis and adapted to complement and envelope one or more of said annular steps;

applicator mouth means projecting from the applicator head at an angle to the opening central axis and co-rotatable therewith from a closed first position in vertical alignment with the vertical axis of the container to an open second position in angular alignment with the vertical axis and farther to an open third position again in vertical alignment with the vertical axis;

passage means communicating between the applicator mouth means and the interior of the container, so that hair treatment medium may flow from the container through its opening, through the applicator head, and out the applicator mouth means, when the applicator head is an open position;

sealing means for preventing the flow of medium when the applicator head is in its first position; and

said distal annular step of said container opening consisting of a nipple whose outer edge moveably biases in an axial direction against the inside of the innermost cylindrical appendage of the applicator head upon rotation of said applicator head, so that fluid flow between the nipple and the cylindrical appendage is effectively controlled.

4,881,559
HAIR CURLING SYSTEM

Lai Kin, Kowloon, Hong Kong, assignor to Windmere Corporation, Miami Lakes, Fla.

Continuation of Ser. No. 503,181, Jun. 10, 1983, Pat. No. 4,564,033. This application Nov. 24, 1986, Ser. No. 934,081

The portion of the term of this patent subsequent to Nov. 25, 2003, has been disclaimed.

Int. Cl.[4] A45D *2/02*

U.S. Cl. 132—226 30 Claims

1. A hair curling roller system comprising:

a housing;

a plurality of post members arranged within said housing and being capable of generating heat in hair rollers placed on said post members, all of said post members of said system being of substantially the same diameter;

a plurality of rollers for curling hair, each of said rollers having an inner core means with an axially extending inner cavity and an outer surface for contact with hair to be rolled;

a first group of said plurality of rollers having a first outer diameter along their center section of their outer surface and a second group of said plurality of rollers having a second outer diameter along their center section of their outer surface with said second outer diameter being larger than said first outer diameter, each of said rollers of both of said groups of rollers having said axially extending inner cavity extending from an opening at one end of said roller and said inner cavities of all of said rollers having substantially the same inner diameter, each of said rollers being capable of being arranged on one of said post members such that said post member extends into said inner cavity of the respective said roller;

said core means of each of said rollers of said second group of rollers including heat transfer means for facilitating the transfer of heat from its said inner cavity to its said outer surface so that when both said groups of said rollers are positioned on said post members and are heated at approximately equal rates the level of heat on the outer surface of all of said rollers is approximately the same.

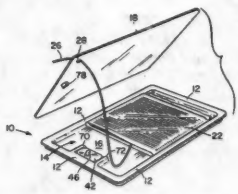
4,881,560
DISPENSER FOR DENTAL FLOSS

Eric Blank, 81 New Bridge Rd., Sudbury, Mass. 01776, and Robert A. Endelson, 330 E. 79th St., New York, N.Y. 10021

Filed Jun. 9, 1988, Ser. No. 204,491

Int. Cl.[4] A61C *15/00*

U.S. Cl. 132—324 13 Claims



5. A thin dental floss dispenser in a credit card format, said dispenser comprising:

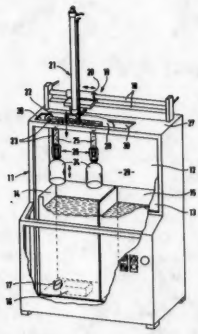
a base panel provided with a peripheral ridge to define a shallow well with a substantially flat bottom,
a flattened supply coil of dental floss located in the well,
a matching face panel marginally bonded to the ridge,
means to permit the leading end of the coil to be pulled out of the well,
a blade with which to sever the floss,
the blade being formed as a tab projecting from a plate,
wall members projecting from the well bottom and surrounding at least a portion of the plate to locate the blade inwardly of the peripheral ridge with the tab projecting through the face panel.

4,881,561

PROCESS AND DEVICE FOR THE FULLY AUTOMATIC CLEANING OF SPRAY GUNS FOULED WITH PAINT OR VARNISH

Gottlob Schwarzwilder, Max-Eyth-Strasse 15, 7488 Wolfschlugen, Fed. Rep. of Germany

Filed Sep. 7, 1988, Ser. No. 241,187
Claims priority, application Fed. Rep. of Germany, Sep. 14, 1987, 3730828; Oct. 9, 1987, 3734267
Int. Cl.[4] B08B *3/10*
U.S. Cl. 134—76 **11 Claims**



1. A device for the fully automatic cleaning of spray guns fouled with paint or varnish, characterized by the combination of the following features:

(a) two preferably closely juxtaposed containers (**14, 15**) open at the top and containing a cleaning fluid on the one hand and a rinsing fluid on the other are disposed in a cabinet-like housing (**11**) with a closable loading and removal opening (**12**);

(b) at least one sonic head (**16**) emitting ultrasonic waves is disposed on the one side wall and/or on the bottom at least of the container (**14**) containing the cleaning fluid;

(c) a vertically reciprocal holder (**22; 49**) is mounted above the containers (**14, 15**), with preferably adjustable holding elements (**23, 25, 26; 50–52; 61–63, 65**) for hanging on or supporting the spray guns (**24**) being disposed on said holder;

(d) the vertically reciprocal holder (**22; 49**) is connected to a motor-driven elevating mechanism (**21; 43**) mounted on a motor-driven carriage (**20; 44**) displacing said elevating mechanism horizontally back and forth;

(e) associated with the containers (**14, 15**) is a circulating and filter means moving the fluid contained in said containers;

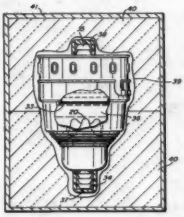
(f) the conduit (**78, 79**) feeding the fluid back into the containers (**14, 15**) is connected to one or more jet pipes (**53, 53'**) provided with jet nozzles (**54, 59**), said jet pipes projecting into the open paint reservoir (**24***a*) of the spray gun (**24**) immersed in the cleaning and/or rinsing fluid, and to one or more flexible connecting hoses connectable to the paint inlet and/or, if applicable, also to the compressed air inlet of the spray guns (**24**).

4,881,562

HEART VALVE AND XENOGRAFT WASHING SYSTEM

Diana R. Wright, Conifer, Colo., and David W. Schlerf, Martinez, Calif., assignors to Pioneering Technologies, Inc., Wheat Ridge, Colo.

Division of Ser. No. 167,707, Mar. 14, 1988, Pat. No. 4,838,288. This application May 1, 1989, Ser. No. 345,180
Int. Cl.[4] B08B *3/04, 11/02*
U.S. Cl. 134—110 **4 Claims**



1. A packaged prosthesis comprising, in combination, a wash chamber comprising top and bottom portions removeably secured together in fluid tight sealed contact, a prosthesis in the wash chamber, the wash chamber comprising means for supporting the prosthesis and, in use, for directing flow of fluid over all surfaces thereof, fluid inlet means on the top, fluid outlet means on the bottom, removeable seals on the respective fluid inlet and outlet means, sterile preservative fluid in the chamber for maintaining the sterility and physical or chemical condition, or both, of the prosthesis contained therein, a protective wrapper entirely enclosing the wash chamber, and means for protecting the chamber from shock and damage enclosing the chamber, the wash chamber being so constructed and configured as to be connectable with a source of sterile wash solution to thereby cause the wash solution flow over the prosthesis for removing chemicals therefrom or treating the prosthesis, or both, all without breaching the sterility of the wash chamber.

4,881,563

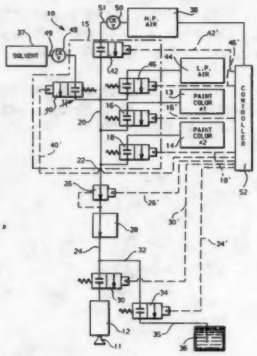
PAINT COLOR CHANGE SYSTEM

Robert L. Christian, Livonia, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 5, 1986, Ser. No. 904,167
Int. Cl.[4] B08B *3/02*
U.S. Cl. 134—166 C **2 Claims**

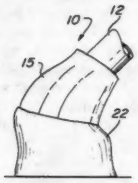
1. A paint color change system for supplying paint to an applicator means comprising, individual sources for at least two paints, a cleaning fluid, high pressure air and low pressure air, manifold means having a common passage for connecting said individual fluid sources to a paint supply line adapted to feed paint to said applicator means, said sources of at least two paints being connected to said common passage downstream of the connections of said source of cleaning fluid and said source of low pressure air to said common passage, said source of high pressure air being connected to said common passage upstream of the connection of said source of cleaning fluid with said common passage, valve means for selectively coupling said individual sources to said manifold, and a controller connected to said valve means and controlling operation thereof so that, after one of said sources of two paints is connected to said applicator means, the low pressure air is connected to the common passage and said supply line to remove essentially all of said one of said two paints followed by the simultaneous introduction into said supply line and said common passage of

a metered flow of said cleaning fluid and said high pressure air so when the high pressure air flows by the connection of said common passage with said source of cleaning fluid the clean-



ing fluid is atomized into fine droplets which are propelled by the high velocity flow of said high pressure air against the residue paint coating the interior walls of said common passage and said supply line to effect removal of said residue paint.

4,881,564
CRUTCH TIP
Thomas Fetterman, 1122 Green St., Philadelphia, Pa. 19123
Filed Oct. 22, 1987, Ser. No. 111,183
Int. Cl.[4] A45B *9/04*
U.S. Cl. 135—82 **7 Claims**



1. A crutch tip for installation on the lower end of a crutch shaft comprising:
- an upwardly open receiver for receiving the lower end of the crutch shaft, the receiver including a lower end;
- an enlarged skirt extending about and depending downwardly from the lower end of the receiver, the skirt including a shoulder with an underside extending radially outwardly from and circumferentially about the lower end of the receiver and a peripheral wall extending downwardly from the outer extremity of the shoulder;
- a generally rigid plate within the skirt and extending across and secured to the lower end of the receiver and the underside of the shoulder and into engagement with the peripheral wall for receiving and spreading forces imparted by the crutch shaft;
- a yieldable shock absorption pad in the skirt and extending downwardly from a lower surface of the plate;
- a flexible tread piece in the skirt extending downwardly from a lower surface of the shock absorption pad, the plate, the shock absorption pad and the tread piece cooperating with the receiver and the skirt for damping and reducing reaction forces from the crutch tip to a user, the tread piece including a plurality of dependent projections for frictional engagement with a supporting surface, said receiver and said skirt being integrally fabricated of a rubber-like material to permit canting of a received crutch shaft at a substantial angle with the tread piece remaining in generally flat facing engagement with the supporting surface.

4,881,565
SUNSHADE
Alan S. Turk, Edgewater, Md.
Filed Aug. 25, 1988, Ser. No. 236,207
Int. Cl.[4] E04H *15/00*
U.S. Cl. 135—101 **5 Claims**

1. A sunshade comprising a pair of rigid support members each having a lower end adapted to be inserted into the ground and an upper end, a substantially rigid cross member having opposed ends, means for releasably interconnecting the opposed ends of said cross member and the respective upper ends of said support members, a panel of flexible sunshading sheet material, and means for connecting an edge of said panel to said cross member along the length thereof such that when the latter is in its position of use connected to said support members and the lower ends thereof are inserted into the ground, said panel is freely supported by said cross member between said support members and out of engagement with any part thereof below said cross member so that when said support members with said cross member and panel connected thereto are disposed in a substantially vertical position across the path of wind said panel may be blown freely from its edge supported by said cross member towards a horizontal position to provide therebeneath an area shaded from the sun, said panel being solely supported by said cross member.

4,881,566
METHOD FOR REDUCING PRESSURE DROP IN THE TRANSPORTATION OF DRAG REDUCER
Sibrand A. Ubels, Waterloo, Belgium, and Steven L. Baxter, Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.
Filed Oct. 11, 1988, Ser. No. 256,806
Int. Cl.[4] F17D *1/16*
U.S. Cl. 137—13 **13 Claims**

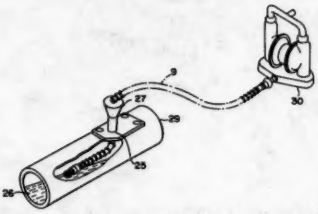
1. A method for reducing the pressure drop in a conduit flowing a viscous drag reducing material which comprises injecting into the conduit at the periphery thereof a liquid material of lower viscosity substantially immiscible with the viscous drag reducing material in a sufficient amount to form a flowing layer of such liquid material on the walls of the conduit.

4,881,567

LIQUID REMOVAL SYSTEM

Gerald Rockower, Brooklyn, N.Y., assignor to Brooklyn Union Gas, Brooklyn, N.Y.

Filed Dec. 2, 1987, Ser. No. 127,396
Int. Cl.[4] F17T *1/00*
U.S. Cl. 137—203 41 Claims



1. A liquid removal apparatus for removing liquid from a container into which it has been inserted, said apparatus comprising:

an elongate hollow flexible member for channelling the liquid as it is removed;

stiffening means disposed within said flexible member for providing longitudinal rigidity to said flexible member, one end of said stiffening means being connected to one end of said flexible member; and

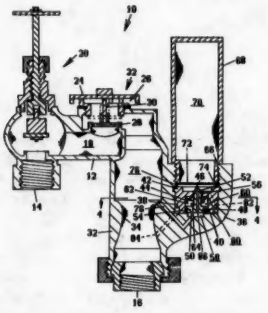
a nose guide fixed to said one end of said flexible member, said nose guide including means for preventing debris from entering said flexible member.

4,881,568

IRRIGATION CHEMICAL DISPENSER

I-Chung Ho, 6958 Grovespring Dr., Rancho Palos Verdes, Calif. 90274

Filed Jul. 6, 1988, Ser. No. 215,741
Int. Cl.[4] A01C *23/04;* A01G *25/06*
U.S. Cl. 137—268 14 Claims



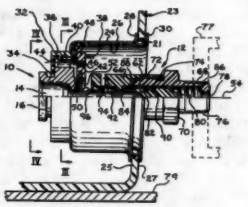
1. An irrigation chemical dispenser comprising: a housing defining an inlet, an outlet, and a flow path extending from said inlet to said outlet for communicating a flow of water therebetween, said housing including a constricting portion intermediate of said inlet and said outlet whereat said flow path defines a venturi throat of minimum cross sectional flow area, an external boss portion of said housing adjacent said constriction portion defining a blind bore opening outwardly upon said housing, a chambered cartridge member for receiving therein a store of water-dispersable irrigation chemical removably and sealingly received in said bore, said cartridge member defining an opening from said chamber thereof within said housing bore, said cartridge member further carrying a penetrable diaphragm member closing said cartridge opening and cooperating with said housing to bound a first chamber within said bore, penetrating means for penetrating said diaphragm member and communicating said cartridge member chamber with said first chamber upon occurence of irrigation water flow in said flow path, and passage means for communicating water from said flow path to said cartridge member chamber and for communicating water mixed with said water-dispersable irrigation chemical to said flow path.

4,881,569

SELF-ALIGNING COUPLING

Paul J. E. Fournier, Jackson; Ernest F. Kulikowski, Marshall, and Alan R. Allread, Jackson, all of Mich., assignors to Aeroquip Corporation, Jackson, Mich.

Filed Nov. 7, 1988, Ser. No. 268,368
Int. Cl.[4] F16L *5/00, 37/28*
U.S. Cl. 137—360 8 Claims



1. A coupling used to connect laboratory animal cages to a drinking water supply, comprising in combination, a female coupling part having an axial passage having an inner connection end and an open outer end and a spring biased valve located within the female axial passage axially moveable between open and closed positions, a male coupling part having an axial passage having an inner connection end and a probe having a free end to be received within said female outer end, first and second support members for supporting said male and female coupling parts, releasable connection means defined on said coupling parts for selectively coupling said parts placing said passages in fluid communication, said first support member attached to a fluid supply manifold, said second support member attached to the rear of a laboratory animal cage, each of said support members supporting an associated coupling part in a position whereby displacing said cage toward said first support member automatically couples said female and male parts coupling parts, said second support member comprising cup shaped male and female grommets, said cage having walls having inside and outside surfaces, said female grommet being received in said cage engaging said cage inside surface, said male grommet engaging said cage outside surface and protruding through said cage wall and received within said female grommet defining a recess, said male part having an annular shoulder engaging said male grommet and an inner end protruding through said grommets into said cage, a nut having mating means with said male inner end whereby tightening said nut compresses said grommets to said cage and supports said male probe within said female gromment recess.

4,881,570

SEAL FOR VALVES

Helmut Ziebach, and Peter Lange, both of Lüdenscheid, Fed. Rep. of Germany, assignors to Flühs Drehtechnik GmbH, Lüdenscheid, Fed. Rep. of Germany

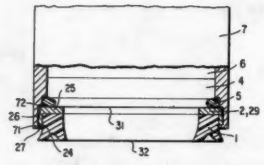
PCT No. PCT/DE87/00388, § 371 Date May 12, 1988, § 102(e) Date May 12, 1988, PCT Pub. No. WO88/02082, PCT Pub. Date Mar. 24, 1988

PCT Filed Aug. 29, 1987, Ser. No. 210,769

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1986, 3631030; Mar. 5, 1987, 8703325[U]

Int. Cl.[4] F16K *3/08*

U.S. Cl. 137—454.2 7 Claims



1. A valve and seal therefor comprising:

(a) a profiled ring having an external surface and an internal end face formed of a rubber elastic material;

(b) a supporting ring disposed about said profiled ring;

(c) said supporting ring being an unslotted spring ring having a cross section in the shape of a horizontal L, the rear portion of said L resting against the internal end face of said profiled ring and the base of said L embracing the external surface of said profiled ring;

(d) an external portion of said supporting ring projecting outwardly from the center of said ring beyond the external surface of said profiled ring, further including a sleeve, a ceramic inlet disc secured by said sleeve at an end face thereof, said profiled ring projecting beyond said end face, a ceramic control disc resting against said inlet disc at the side thereof distant from said end face, said unslotted spring ring being positioned in said sleeve between said profiled ring and said inlet disc,the internal diameter of said spring ring being smaller than the external diameter of said inlet disc.

4,881,571

MODULATING PRESSURE OPERATED PILOT RELIEF VALVE

Raymond G. Reip, Indian Head Park, Ill., assignor to Dresser Industries, Inc., Dallas, Tex.

Continuation of Ser. No. 864,665, May 19, 1986, Pat. No. 4,791,955, which is a continuation of Ser. No. 534,594, Sep. 22, 1983, Pat. No. 4,615,356. This application Oct. 26, 1988, Ser. No. 263,173

The portion of the term of this patent subsequent to Oct. 7, 2003, has been disclaimed.

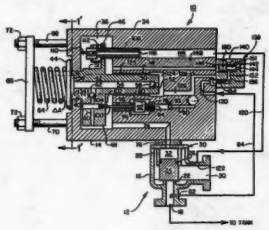
Int. Cl.[4] G05D *16/00*

U.S. Cl. 137—488 14 Claims

9. A valve assembly, comprising:

a main valve including a main valve body with an inlet and an outlet, a chamber, a closure member reciprocally mounted in said chamber sealingly engaging said inlet in the valve closed position, a head volume in said chamber above said closure member,

a pilot valve including a body defining first and second pilot chambers, means isolating said first pilot chamber from said second pilot chamber, a differential pilot piston reciprocally mounted in said first and second pilot chambers, said pilot piston including at least one surface in said first pilot chamber with a first side of larger diameter than a second side, first means for communicating said first pilot chamber and said head volume, second means for communicating said inlet of said main valve with said first pilot chamber, said second means including a first valve actuable by said pilot piston for controlling fluid flow into said first pilot chamber, third means for communicating said



outlet of said main valve with said first pilot chamber, said third means including a second valve actuable by said pilot prison for controlling fluid flow out of said first piston chamber.

4,881,572

SYSTEM FOR CONTROLLING AUTOMATICALLY THE SETTING OF A DAMPER IN A VENTILATION DUCT

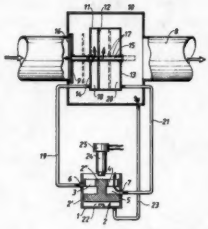
Lars-Erik Bengtsson, Saltsjö Duvnäs, Sweden, assignor to Stifab AB, Tomelilla, Sweden

Filed Apr. 1, 1988, Ser. No. 176,641

Claims priority, application Sweden, Apr. 3, 1987, 8701398

Int. Cl.[4] G05D *16/00*

U.S. Cl. 137—488 2 Claims



1. A control system for setting the position of a damper in a ventilation duct and maintaining a substantially constant pressure at a selected region downstream of said damper in the ventilation duct, said system comprising a double acting pilot valve having:

a vertically oriented cylinder and housing;

a readily movable, pressure-responsive piston device which rides on air in the cylinder and which together with the cylinder defines a pressure space, which communicates directly with the ventilation duct at said selected region;

said cylinder having two control orifices being disposed for being selectively obstructed by said piston device;

said pressure responsive piston device being disposed for vertical movement in said vertically oriented cylinder, said piston having two surfaces for selectively obstructing said two control orifices;

one of said two control orifices being disposed in said vertically oriented cylinder for being obstructed by said pressure responsive piston device on upward movement thereof; and

the other of said two control orifices being disposed in said vertically oriented cylinder for being obstructed by said

pressure responsive piston device on downward movement thereof;

said two control orifices comprising a first and second control orifice;

said system further comprising drive means being connected to said damper for driving said damper and thus for opening and closing said damper;

said drive means being for adjusting the damper setting in response to movement of said pressure-responsive piston device, such as to maintain said pressure, wherein the pressure-responsive device has a mass which corresponds to a selected pressure at said region in the duct, and is intended when in a floating position in the cylinder to balance the force acting on the side of said device which faces the pressure space with said selected pressure;

said drive means comprising:

a double acting drive cylinder;

a double acting drive piston having two sides being disposed in said double acting drive cylinder;

a first and a second chamber being diposed one on each side of said double acting drive piston;

means for admitting a gas under pressure to each of said chambers on either side of said drive piston;

a first conduit connected between said first of said control orifices of said double acting pilot valve and second of said two chambers of said drive piston;

a second conduit connected between said second of said control orifices of said double acting pilot valve and said second of said two chambers of said drive piston;

said first and said second conduits being connected for adjusting the damper to a position in which the pilot valve piston device is returned to a balance position thereof;

the piston of the drive means and the damper being adjustable, in dependence on a position of imbalance of said piston device of said pilot valve by pressure control in the chambers to adjust the damper to a position in which the pilot piston device is returned to a balance position determined by the mass of said pilot piston device.

4,881,573

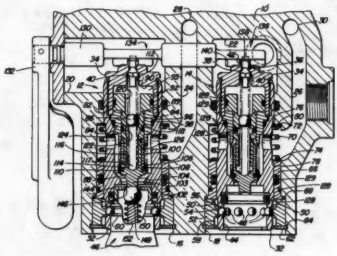
FEMALE HYDRAULIC COUPLER WITH PUSH-CONNECT AND LEVER DISCONNECT

Douglas M. Durant, Waterloo; Uwe H. Kugler, Cedar Falls; Bennie J. Vaughn, Cedar Falls; Douglas W. Nordquist, Cedar Falls, and Larry M. Delfs, Cedar Falls, all of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Jan. 31, 1989, Ser. No. 304,699

Int. Cl.[4] F16L *29/00*

U.S. Cl. 137—614.04 **14 Claims**



1. A female hydraulic coupler comprising:

(a) a housing having formed therein a stepped bore, a sump chamber at one end of said stepped bore and a fluid passage connecting to said stepped bore;

(b) a hollow substantially cylindrical receptacle slidably mounted within said stepped bore, said receptacle having a sump end at least adjacent to said sump chamber and a receiving end away from said sump chamber, and further having:

(1) a receiving bore formed at said receiving end of said receptacle for receiving a male coupler, with a plurality of lock ball bores spaced around said receiving bore and extending substantially radially through said receptacle;

(2) a plurality of lock balls, each being disposed in a corresponding one of said lock ball bores;

(3) a main valve seat formed on an inner surface of said receptacle adjacent to said receiving bore; and

(4) first and second shoulders formed in the outer circumference of said receptacle;

(c) an end cap sealingly closing said sump end of said receptacle, said end cap extending into said sump chamber of said housing;

(d) a piston slidably mounted within said end cap and said receptacle, said piston having:

(1) a piston head slidably received within said end cap, said piston head, end cap and receptacle defining a piston chamber therebetween; and

(2) a piston rod extending towards said receiving bore;

(e) piston fluid connection means for fluidly connecting said fluid passage formed in said housing with said piston chamber;

(f) a main poppet slidably mounted to said piston rod and sealable against said main valve seat to seal the receiving bore off from the remainder of the receptacle;

(g) spring means for biasing said main poppet towards said main valve seat;

(h) an annular control sleeve surrounding the receiving bore end of said receptacle and having a land formed on the inner surface thereof with a recess formed on either side of said land, said control sleeve forcing said lock balls into a position extending inside said receiving bore when said lock balls are positioned adjacent said land and allowing said lock balls to move to a position completely outside of said receiving bore when said lock balls are positioned adjacent either of said recesses;

(i) first and second washers surrounding said receptacle, each washer being engagaeable with one of said shoulders formed on said receptacle exterior and with one of a corresponding shoulder formed in said stepped bore in said housing and said control sleeve;

(j) a receptacle spring surrounding said receptacle and compressed between said first and second washers;

(k) a cam shaft pivotally mounted in said housing adjacent said end cap and having an end cap cam surface thereon for engaging said end cap; and

(l) a lever connected to said cam shaft for rotating said cam shaft.

4,881,574

ENCLOSED ROTARY DISC AIR PULSER

A. L. Olson; Tom A. Batcheller, both of Idaho Falls; J. A. Rindfleisch, and John M. Morgan, both of Arco, all of Id., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Aug. 12, 1988, Ser. No. 231,427

Int. Cl.[4] F16K *11/06*

U.S. Cl. 137—624.13 **11 Claims**

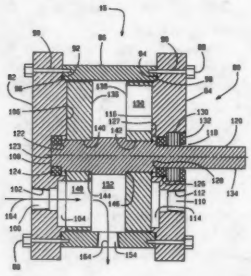
1. An enclosed rotary disc air pulser for controlling the flow of a non-lubricating source of air comprising:

a housing a first end plate with an inlet port, a second end plate with an exhaust port and a central section disposed between said end plates and having a pulse leg port;

and elongated shaft mounted in said housing and adapted for axial rotation therein;

first and second disc members, each said disc member being fixedly secured to said shaft within said housing in spaced relation to each other between said first and second end plates and on opposing sides of said pulse leg port so as to define an undivided chamber therebetween, said chamber being in communication with said pulse leg port, each said

disc member having a substantially identical milled out portion defining a single opening and being positioned upon said shaft, said milled out portions being diametrically out of phase with each other so that as said shaft



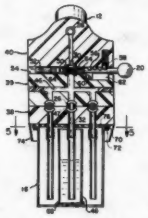
rotates, said disc members permit alternating cyclical communication of the non-lubricating source of air through said milled out portions and between said inlet port and said chamber and said exhaust port and said chamber.

4,881,575

SHOWER HEAD DISPENSING FIXTURE

Richard J. Smith, 715 Rose Ave., Pleasanton, Calif. 94566

Filed Sep. 12, 1988, Ser. No. 242,600
Int. Cl.[4] F16K *19/00*
U.S. Cl. 137—889 **13 Claims**



1. A personal shower fixture insertable between a shower water input pipe and a shower head for introducing selected fluids into the water flow to the shower head, said fixture comprising:

a housing having a water input pipe and output pipe;

a venturi between said input pipe and output pipe;

a plurality of fluid chambers;

a fluid conduit having a first end and a plurality of second end branches, each of said plurality of second end branches terminating in one of said plurality of chambers, the first end of said fluid conduit terminating in the throat of said venturi;

a manually operable on-off switch in each of said plurality of second end branches for selecting fluid from one or more of said plurality of fluid chambers to be drawn through said conduit into said venturi and into the water flow to the shower head;

said manually operable on-off switch comprising a valve rod slideable through a valve rod hole through said housing and normal to said conduit branch, said valve rod having an opening alignable with said conduit branch and having sealing means for preventing leakage of fluid between said rod and said valve rod hole; and

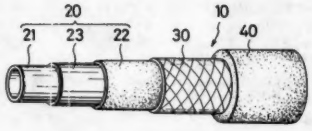
a manually operable flow regulator in said fluid conduit for controlling the amount of fluid drawn from said fluid chambers into said venturi.

4,881,576

HOSE FOR TRANSPORT OF REFRIGERANT FLUIDS AND FUEL OILS

Tetsu Kitami, Hadano, and Jun Mito, Naka, both of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan

Filed Dec. 11, 1987, Ser. No. 131,670
Claims priority, application Japan, Dec. 16, 1986, 61-297720
The portion of the term of this patent subsequent to Nov. 14, 2006, has been disclaimed.
Int. Cl.[4] F16L *9/12*
U.S. Cl. 138—125 **5 Claims**



1. A hose for use in transporting refrigerant fluids or fuel oils which hose comprises:

(a) a core tube comprising an inner peripheral wall, an intermediate peripheral wall and an outer peripheral wall, said inner wall being formed of a first resin which is predominately nylon 11 or nylon 12, or a combination thereof; said intermediate wall being formed of a second resin which essentially comprises 40–80% by weight of nylon 6 or nylon 6/66, 5–30% by weight of nylon 11 and 10–40% by weight of a polyolefin; and said outer wall being formed of a rubbery material;

(b) a reinforcing layer laminated over said outer wall; and

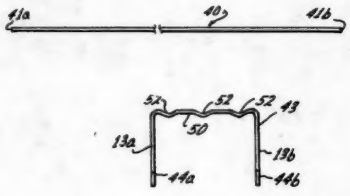
(c) an outer wall disposed outwardly around said reinforcing layer, said hose having a high gas impermeability and a high resistance to stress cracking.

4,881,577

METHOD OF FORMING CANTILEVERED SUPPORT ARMS FOR PLASTIC BAG RACK

Alvin L. Stroh, Downey, and Terry C. Pilon, Claremont, both of Calif., assignors to McMillin Wire & Plating, Inc., Los Angeles and Challenge Bag California, Inc., Rancho Cucamonga, both of, Calif.

Division of Ser. No. 202,329, Jun. 6, 1988, Pat. No. 4,840,336.
This application Apr. 17, 1989, Ser. No. 339,320
Int. Cl.[4] B21F *45/00*
U.S. Cl. 140—71 R **6 Claims**



1. A method for forming an integral pair of cantilevered support arms for use in suspending plastic bags on a rack, said method comprising:

providing a single straight length of wire having a middle portion and end portions with terminal ends;

forming a bent structure by bending back each of the end portions of the single length of wire below its middle portion so as to be parallel therewith but spaced therefrom with the terminal ends thereof spaced from each other and with each end of the bent structure having a U shape;

pulling the spaced terminal ends of the end portions together and securing them to provide a straight lower portion thereby causing the middle portion to be bowed upwardly resulting in the U shaped ends on the structure now opening up with a wider angle;

pressing down on the upwardly bowed middle portion inward from each end thereof such that it is now in contact with the straight lower portion thereby causing the ends of the two-wire structure to have upwardly directed looped protuberances thereon; and

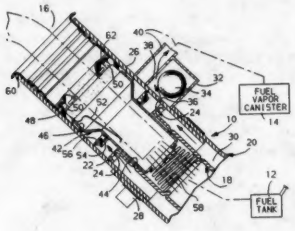
bending each end portion of the bent structure so formed so that it is positioned at right angles to the remaining straight back portion to thereby provide the cantilevered support arms.

4,881,578

COMBINATION FILLER PIPE AND VAPOR CONTROL MEANS

Gregory E. Rich, Richmond; Roy A. Giacomazzi, Rochester Hills, and Jack C. Wilds, Mount Clemens, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 2, 1988, Ser. No. 265,971
Int. Cl.[4] B65B *31/00*; F16K *24/00*
U.S. Cl. 141—44 **2 Claims**



1. In a vehicle fuel vapor loss control system of the type that uses a stream of liquid fuel that exits a fuel nozzle during fuel fill to prevent fuel fill vapor displaced from said tank from exiting past said nozzle to atmosphere, a combined filler pipe and vapor control means for routing said fuel fill vapors to a storage canister and for also preventing pressurized fuel vapors that form in said tank when said filler pipe is closed by a cap from exiting to atmosphere when said cap is removed, said combined filler pipe and vapor control means comprising,

a first generally cylindrical pipe sized to receive said nozzle at an upper end and opening at a lower end into said tank so as to admit fuel thereto, said first pipe further including a radially outwardly extending flange at said upper end with at least one opening therethrough,

a second generally cylindrical pipe of larger diameter opening at a lower end to said tank and surrounding said first pipe so as to form an annular space therewith, said second pipe upper end being located proximate to said first pipe upper end and having a predetermined radial spacing from said flange,

a generally cylindrical sleeve having a wall thickness substantially equal to said predetermined radial spacing so that the lower end thereof may be tightly inserted between said second pipe and said flange to maintain said first and second pipe upper ends rigidly coaxial to one another, said sleeve further including means at the upper end thereof to receive said cap and seal said sleeve from atmosphere until said cap is completely removed,

a hollow valve body in the form of a stepped cylinder having a lower portion that fits slidably within said first pipe upper end and an upper portion that fits slidably within said sleeve upper end,

resilient means biasing said valve body upwardly,

a seal mounted to the outside of said valve body and having a lower face sized so as to cover said flange opening,

a ring at the top of said valve body through which nozzle is receivable with radial clearance and which is engageable with said cap when said cap is in place to hold said valve body down with said seal face covering said flange opening, and,

a vent line opening through said sleeve just above said flange and running to said storage canister,

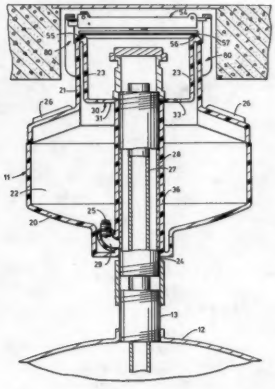
whereby, when said cap is in place, said annular space and said vent line are separated by said seal face covering said flange opening, and as said cap begins to be removed from said sleeve, said sleeve upper end remains blocked to atmosphere by said cap as said valve body begins to slide up under the force of said resilient means, guided by said first pipe and said sleeve, to uncover said flange opening so that any pressurized fuel vapors in either said first pipe or said annular space may exit only through said vent line, and after said cap is removed and said nozzle is inserted through said ring and into said first pipe upper end and fuel is dispensed, said valve body remains up and fuel vapors displaced from said tank will be displaced up said annular space and out through said vent line only.

4,881,579

LIQUID OVERFILL TANK ASSEMBLY

Bruce R. Sharp, 4090 Rosehill Ave., Cincinnati, Ohio 45229

Continuation-in-part of Ser. No. 858,656, May 1, 1986, abandoned. This application Jun. 26, 1987, Ser. No. 66,701
Int. Cl.[4] B65B *3/06*
U.S. Cl. 141—86 **21 Claims**



1. An assembly for use with an underground liquid storage tank to control overfill of liquid during a filling operation, comprising:

(a) a dump tank molded of one piece construction from a polymeric material having a reservoir portion with a bottom wall and a neck extending from the reservoir portion wherein the bottom wall has an opening to accommodate a fill tube and the neck has an opening at its top whereby access is gained to the interior of the dump tank;

(b) a fill tube securely positioned in said dump tank with a first extremity near the dump tank's neck and a second extremity extending through the opening in the dump tank's bottom wall, further wherein an extension of the bottom wall of the reservoir portion of the dump tank

extends at least one inch along the fill tube's length from the point where the fill tube's second extremity enters said dump tank bottom wall to encase the at least one inch of the fill tube with a shrink-fit covering to ensure that liquid which spills into the dump tank will not seep therethrough;

(c) piping which extends from the dump tank's reservoir portion to the fill tube;

(d) a directional flow control valve associated with the piping through which overfilled liquid can flow in response to opening of the flow control valve; and

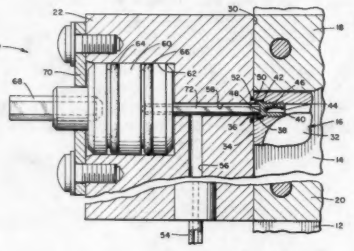
(e) a cover for fitting over the opening at the top of the dump tank neck so as to form a sealed closing of the dump tank.

4,881,580

FIXTURE ADAPTED FOR EVACUATING AND FILLING HEAT PIPES AND SIMILAR CLOSED VESSELS

John E. Murphy, Los Angeles; Joseph E. Snyder, El Segundo, and William T. Gardner, Los Angeles, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Division of Ser. No. 825,127, Feb. 3, 1986, Pat. No. 4,776,389.
This application Jul. 18, 1988, Ser. No. 220,631
Int. Cl.[4] F28D *15/02*; B65B *3/04*
U.S. Cl. 141—98 **7 Claims**



1. A fixture for holding a heat pipe having a filling end and an opposite end and having a fill port with a valve in the filling end, comprising:

a base adapted to be longer than the heat pipe;

a block mounted on said base having a stop face thereon;

guide means adapted for guiding a heat pipe so that the filling end of the heat pipe engages said stop face;

clamp means on said base adapted for engaging on the opposite end of the heat pipe for clamping the heat pipe against said stop surface;

a passage adapted for said block in communication with the fill port in the heat pipe;

seal means adapted for sealing said stop face against the heat pipe; and

a hex driver in said passage adapted for engaging and rotating the valve in the fill port and means for sealing said driver with respect to said block.

4,881,581

VEHICLE AUTOMATIC FUELING ASSEMBLY

James A. Hollerback, 5693 Wood Valley Dr., Haslett, Mich. 48840

Filed Sep. 23, 1988, Ser. No. 248,154
Int. Cl.[4] B67D *5/04*; B65B *3/04*
U.S. Cl. 141—113 **5 Claims**

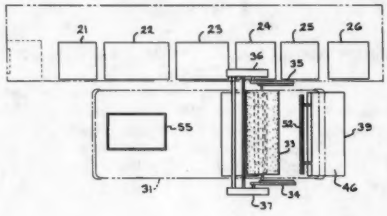
1. In a vehicle automatic fueling assembly for automatically fueling a vehicle while the driver remains in the vehicle and without external manual assistance, the combination comprising:

an automatic teller-type command center provided in a vehicle automatic fueling assembly, said command center adapted to be selectively energized by a vehicle driver in a vehicle parked in close proximity thereto so as to initiate automatic fueling of said vehicle;

a vehicle mounted specially modified gasoline tank, said specially modified gasoline tank provided with an automatic cut-off fuel receiving valve assembly in operative engagement therewith;

a computer control assembly in operative command control engagement with said automatic teller-type command center, said computer control assembly adapted to selectively operate selected components of a vehicle automobile fueling assembly upon receipt of commands from said teller-type command center;

a robot controlled fueling assembly provided in close proximity to said vehicle being fueled, said robot controlled fueling assembly provided with an automatic cut-off fueling nozzle assembly, said robot fueling assembly being operatively connected to said computer control assembly,



said robot controlled fueling assembly adapted to move said automatic cut-off fueling nozzle into mating fueling engagement with said automatic cut-off fuel receiving valve assembly upon command from said computer control assembly, said robot fueling assembly adapted to selectively disengage from said fuel receiving valve assembly when the fueling has been completed upon command from said control assembly;

fuel supply and delivery assembly means operatively connected to said computer control assembly, said fuel supply and delivery means adapted to selectively deliver fuel to said automatic cut-off fueling nozzle upon command from said computer control assembly; and

at least one wheel stop lock assembly operatively connected to said computer control assembly, said wheel stop lock assembly movable into retentive lock engagement with the front wheels of a vehicle proximate thereto upon command from said computer control assembly.

4,881,582

JIB-MOUNTED SUSPENSION DEVICE FOR A TIMBER HARVESTER

Lauri K. Ketonen, Huvilakatu 15, SF-64100 Kristiinankaupunki, Finland

PCT No. PCT/FI87/00064, § 371 Date Oct. 28, 1988, § 102(e) Date Oct. 28, 1988, PCT Pub. No. WO87/06794, PCT Pub. Date Nov. 19, 1987
PCT Filed May 13, 1987, Ser. No. 267,123
Claims priority, application Finland, May 13, 1986, 861985; Feb. 10, 1987, 870530
Int. Cl.[4] A01G *23/08*
U.S. Cl. 144—3 D **4 Claims**

1. A suspension device for suspensing a feller processor from the end of a loader jib, comprising:

universal joint means supported from the end of the loader jib;

an axle having a proximal end depending from the universal joint means so as to hang freely from the loader jib, and having a distal end;

a sleeve disposed on the axle spaced apart from the proximal end;

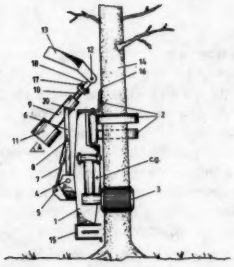
a bearing supporting the sleeve from the distal end of the axle;

a turning motor secured to the sleeve and operative to rotate the axle relative to the sleeve;

a suspension frame secured to the sleeve at an acute angle relative to the axle and having a lower end depending downwardly therefrom;

means at the lower end of the suspension frame for pivotable attachment of a feller processor which has a center of gravity spaced beyond the pivotable attachment; and

operating means associated with the suspension frame and the feller processor and operative to pivot the attached feller processor either to a substantially horizontal position where the center of gravity of the feller processor is below the pivotable attachment and is approximately in



line with the pivotable attachment and the swivel joint means or to a substantially vertical position where the attached feller processor is positioned to receive a tree to be cut and said center of gravity is horizontally spaced from the pivotable attachment and from the suspension frame on the side thereof opposite the turning motor;

thereby causing the weight of the attached feller processor acting through the suspension frame to position the freely-hanging axle and sleeve at an acute angle to horizontal in both the horizontal and vertical positions of the feller processor, so that rotation of the axle by the turning motor causes the suspension frame and the attached feller processor to turn on substantially a vertical axis about the universal joint means while imparting only axial loading on the bearing.

4,881,583

WOODWORKING MACHINE

Jürgen Zehender, Huettlingen, Fed. Rep. of Germany, assignor to Okoma Oberkochener Machinen GmbH, Oberkochen, Fed. Rep. of Germany

Filed May 23, 1988, Ser. No. 197,187

Claims priority, application Fed. Rep. of Germany, May 23, 1987, 3717411; Apr. 26, 1988, 3814018

Int. Cl.[4] B27M *1/08*

U.S. Cl. 144—3 R **12 Claims**

1. A woodworking machine for tenon and mortise cutting and lenghwise profiling of a rectangular wooden workpiece, comprising:

(a) a table;

(b) a conveyor mounted on said table for advancing said workpiece;

(c) a roller table having a first side and a second side and first end and a second end mounted on said table perpendicular to said conveyor;

(d) means on said roller table for clamping said workpiece;

(e) means for tenoning and mortising said workpiece;

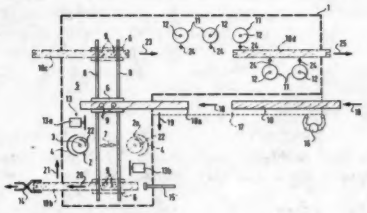
(f) means for lengthwise cutting said workpiece;

(g) means for lowering said means for tenoning and mortising and said means for lengthwise cutting below said table and said roller table;

(h) means for displacing said means for tenoning and mortising from a first position on said first side to a second position on said second side;

(i) means for advancing said workpiece from said first end to said second end past said first position;

(j) means for lengthwise adjustment of said workpiece in said means for clamping at said second end;



(k) means for advancing said lengthwise adjusted workpiece from said second end to said first end past said second position;

(l) means for lengthwise profiling said workpiece mounted on said table; and

(m) means for transferring said workpiece from smaid first end to said means for lengthwise profiling.

4,881,584

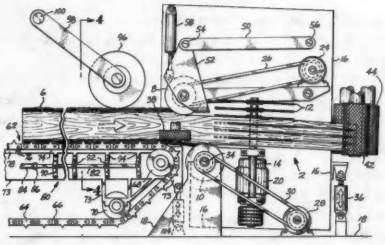
INFEED CONVEYOR FOR SAW

Frank Wislocker, Sumner, and Charles Blickenderfer, Puyallup, both of Wash., assignors to Weyerhaeuser Company, Tacoma, Wash.

Filed Jan. 9, 1989, Ser. No. 294,233

Int. Cl.[4] B27C *9/00, 1/08*

U.S. Cl. 144—39 **15 Claims**



9. In combination, a saw and an infeed conveyor for the saw for optimally feeding cants or logs having varying amounts of sweep from piece to piece which comprises:

an endless sharp chain for conveying the cants to the saw;

means to drive the sharp chain, said means including a tail sprocket at the cant receiving end and a head sprocket at the cant discharging end;

a flexible slide bar for supporting at least that portion of the sharp chain adjacent the head sprocket;

first frame means for mounting and supporting the drive means and slide bar;

bending means for conforming the slide bar between a straight line and a line which approximates an arc of a circle so that said sharp chain path thereby follows the slide bar configuration;

fixed position third frame means for supporting a saw assem-

bly, said assembly including at least one saw mounted on an arbor;

pivotable fourth frame means mounted on said third frame means, said foruth frame means including at least one generally horizontal circular saw; and

tilting means for the fourth frame means to skew the saw assembly so that the projected continuation of the discharge portion curvature of the conveyor is essentially tangent to a plane parallel to the plane of the saw at a point on the projection of the axis of the saw arbor thereby controlling the entry angle of the cant into the saw to prevent binding, said conveyor being configurable into an arc which approximates the sweep curvature of a cant so as to guide the cant into the saw along a path approximating its radius of curvature.

4,881,585

BENCH TYPE MILLING CUTTER

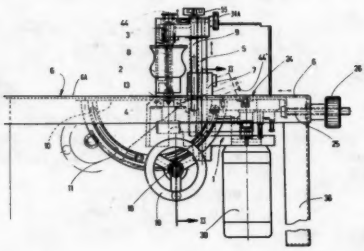
Otto Bergler, Mühlacker-Lomersheim, Fed. Rep. of Germany, assignor to Black & Decker Overseas AG, Vaduz, Liechtenstein

Filed Oct. 27, 1988, Ser. No. 263,263

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1987, 3736757

Int. Cl.[4] B27C *5/00*

U.S. Cl. 144—134 A **24 Claims**



1. A milling apparatus comprising:

a work bench having a work table with a passage therethrough,

a carrier operably connected to said work bench for rotation relative thereto within an upright plane, said carrier including a first portion disposed beneath said table and a second portion disposed above said table,

a bearing block assembly carried by said carrier and including:

a lower leg carrying a lower bearing;

an upper leg carrying an upper bearing aligned with said lower bearing, said upper and lower legs spaced apart, with said upper portion of said carrier disposed therebetween,

a tool axle lying in said upstanding plane and mounted in said upper and lower bearings, and

drive means for driving said tool axle about an axis,

said bearing block assembly extending through said passage and arranged such that said lower leg is disposed below said table, and said upper leg is disposed above said table,

said bearing block assembly being connected to said carrier for vertical linear adjustment relative to said carrier,

first manually actuable means disposed above said table for effecting said vertical linear adjustment of said bearing block assembly, and

second manually actuable means for effecting said rotation of said carrier relative to said table.

4,881,586

ALL-TERRAIN PNEUMATIC TIRE

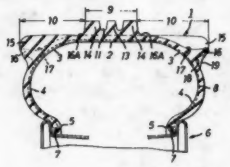
Masami Shinomiya, Osaka, Japan, assignor to The Ohtsu Tire & Rubber Co., Ltd., Osaka, Japan

Filed Feb. 4, 1988, Ser. No. 152,308

Claims priority, application Japan, Feb. 28, 1987, 62-45786

Int. Cl.[4] B60C *11/03*

U.S. Cl. 152—209 B **10 Claims**



1. An all terrain pneumatic tire having a central circumferential area with a tread pattern thereon for on-road service comprising traction grooves and having an off-road tread pattern on both sides of the central area, said off-road pattern comprising a plurality of lugs formed on each shoulder of said tire, wherein said tread pattern for on-road service is projected radially outward further than the off-road pattern so that the tread pattern for on-road service is used during on-road service while the off-road pattern is kept out of contact with the road, and wherein during off-road service, the tread pattern for on-road service is immersed in the ground and the off-road pattern is subjected to contact with the ground; said lugs of said off-road pattern projecting generally axially of the tire and said lugs formed to be radially inward of groove ends at the bottoms of said traction grooves to keep the lug outer surfaces from contact with the road in on-road service during the entire period of wear of the tread pattern for on-road service, said off-road pattern further having an annular wing which extends circumferentially along the tire between adjacent lugs, wherein a curved recess is formed facing generally outwardly of said tire circumferentially adjacent each said wing between said lugs, so that said curved recess and said lugs together form a means for surrounding and holding soft material that otherwise would be displaced towards the tire sides during off-road service to enhance tire flotation, wherein a circumferential surface of each wing is located radial-heightwise at an intermediate height of the lugs and is located to be inward of the groove ends of said traction grooves.

4,881,587

HEAVY DUTY PNEUMATIC RADIAL TIRE

Kazuyuki Kabe, Tokyo; Tatsuo Suzuki, Hayama, and Ken Takahashi, Atsugi, all of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan

Filed May 5, 1988, Ser. No. 190,449

Claims priority, application Japan, May 29, 1987, 62-131592

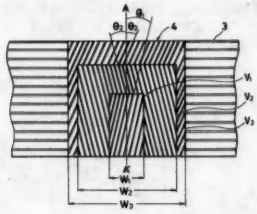
Int. Cl.[4] B60C *9/20*

U.S. Cl. 152—534 **5 Claims**

1. A heavy duty pneumatic radial tire for a road vehicle comprising at least three belt layers V_1, V_2, and V_3 disposed in that order between a tread and a carcass layer from the ground-contacting portion of said tread towards said carcass layer wherein the angles Θ_1, Θ_2, and Θ_3 of cords constituting said belt layers V_1, V_2, and V_3, respectively, relative to a

circumferential tire plane satisfy the relationships represented by the following formulae (I) to (IV):

(I) $\Theta_1 < \Theta_2 < \Theta_3$,



(II) $10° < \Theta_1 < 20°$

(III) $0° < \Theta_2 - \Theta_1 < 5°$, and

(IV) $7° < \Theta_3 - \Theta_2 < 13°$.

4,881,588

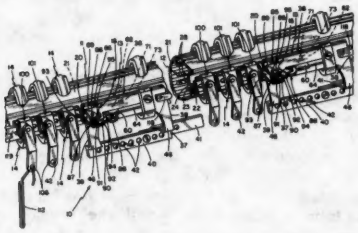
DRAPERY HANGER AND MANIPULATOR

Harold L. Madsen, 14615 S. Clark St., Dolton, Ill. 60419

Filed Sep. 22, 1988, Ser. No. 247,497

Int. Cl.[4] A47H *1/00*

U.S. Cl. 160—345 **16 Claims**



1. An improved drapery hanger and manipulator for supportably hanging and manipulating one or more drapery curtain panels having a leading and a trailing edge portion comprising a single track traverse track bridge to be positioned over an area to be covered by the drapery curtain panels, drapery hook hanger means, said bridge having a track means therealong slidably supporting said drapery hook hanger means, drapery carriers serially slidably supported in said bridge track having independent movement along said bridge and supporting leading portions of respective drapery panels, drapery hook hanger means slidably supported in said bridge track means and supporting drapery hook means slidably along said bridge supporting the drapery panels from the leading to the trailing edge thereof, said drapery hook hanger means supporting the trailing edge of said panels having frictional mounting means frictionally slidably supporting said trailing edge drapery hook hanger means in said bridge track normally retaining and resisting rearward movement of said panel trailing edge, a linear drive means having forward and reverse drive means selectively providing forward and reverse linear drive along said bridge, said carriers having forward drive receiving means for sequentially receiving forward drive from said linear drive means for respectively moving said panels by urging the leading edge thereof along said bridge in a direction away from the trailing edge thereof, said carriers having a releasable reverse drive receiving means for disconnectably and respectively receiving said reverse drive means to normally respectively drive said carriers in a reverse direction along said bridge for respectively moving said panels by urging the leading edge along said bridge in a direction toward the trailing edge thereof for collapsing said panels toward the respective trailing edge thereof and moving said panels in the reverse direction, a reverse drive disengaging means as part of one or more of said carriers and adapted for normally releasably engaging and retaining said carrier thereof to said drive, said reverse drive disengaging means having a release means adapted for responding to contact with the next adjacent object in the reverse direction releasably disengaging said carrier thereof from said drive, whereby said carriers can be driven in the forward direction by said forward drive means to sequentially position drapery curtain panels over a given drapery area, and in the reverse direction by said reverse drive means respectively toward and against the frictional retention of said trailing hook hanger means to individually respectively collapse said panels toward said frictionally positioned retainers or to withdraw said panels from the given area by continuous reverse movement to provide respective separate light openings for each panel or to selectively completely remove or collapse said panels from the given area.

4,881,589

MOLD FOR CONTINUOUS CASTING OF A FLANGED ROLLABLE BILLET FOR A ROLLED GIRDER OR BEAM AND ROLLABLE BILLET MADE THEREWITH

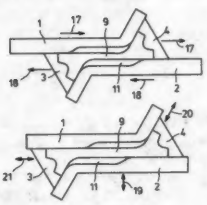
Hans-Heinrich Hartmann, Meerbusch, and Hans Streubel, Erkrath, both of Fed. Rep. of Germany, assignors to SMS Schloemann-Siemag Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Jun. 27, 1988, Ser. No. 211,757

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1987, 3721266

Int. Cl.[4] B22D *11/00*

U.S. Cl. 164—491 **12 Claims**



1. In a mold for continuous casting of a rollable steel flanged billet comprising a web and two flanges for making a steel beam or girder comprising two side walls extending over said web and said flanges and two end walls determining the thickness of said flanges positioned movably between said side walls, the improvement wherein each of said side walls has a single straight portion and a single bent out end portion directed exteriorly bent from said straight portion, each of said end walls is positioned between one of said straight portions and an adjacent opposing one of said bent out end portions and at least one of said side walls is movable in the direction of a planar surface of said side wall relative to the other of said side walls transverse to the casting direction.

4,881,590

APPARATUS FOR COOLING, STORING AND INDUCTIVELY REHEATING COMPLETE MEALS

Hermann Meier, Horw, Switzerland, assignor to Berndorf Luzern AG, Luzern, Switzerland

Filed Mar. 17, 1988, Ser. No. 169,483

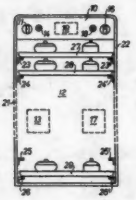
Claims priority, application Switzerland, Mar. 30, 1987, 01210/87

Int. Cl.[4] F25B *29/00*

U.S. Cl. 165—48.1 **4 Claims**

1. Apparatus for cooling, storing and reheating complete

meals, which are prepared so that they are ready to eat, introduced in portions into appropriate tableware for eating and drinking and arranged on a tray, comprising a refrigerator which, in addition to a cooling unit for the refrigerator , is equipped with a generator for inductively transmittable electrical energy, and trays, each of which has at least one induction coil which is operatively coupled to the generator when the tray is placed in the refrigerator, and tableware components which have a metal layer at least on the outer surface of the base, the said metal layer being suitable for inductive heating by said induction coils, a temperature monitoring means (19), wherein the temperature monitoring means contains an induc-



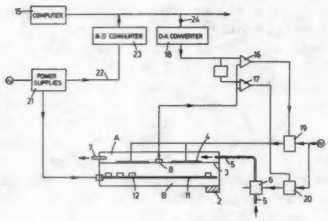
tion (41) fixed in the refrigerator apart from said trays and a workpiece (42) adjacent to said induction coil (41) disposed for inductive heating thereby the heat capacity of said workpiece being virtually equivalent to that of a full plate of tableware and said workpiece having a temperature measuring means (47) mounted thereon for controlling a switch for the supply voltage to the generator (17), said temperature monitoring means switching the generator (17) off or on during the heating time responsive to the temperature measuring means (47) exceeding a predetermined temperature or falling below it thereby simulating the temperature of the tableware in the region of the metal layer.

4,881,591

OVEN FOR THE BURN-IN OF INTEGRATED CIRCUITS

Michael W. Rignall, Dursley, Great Britain, assignor to Sharetree Limited, Stroud, England

Filed May 21, 1987, Ser. No. 53,107
Int. Cl.[4] F25B *29/00*; G01R *15/12*
U.S. Cl. 165—26 **12 Claims**



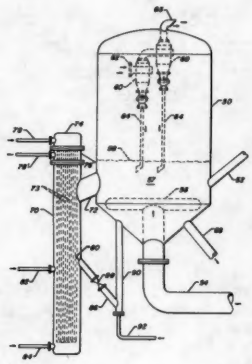
1. An oven for the burn-in of integrated circuits, comprising: a first chamber for receiving such circuits: first means for heating such integrated circuits in the first chamber; means for feeding such circuits with supply voltages; and control means for controlling the first means, including computer means for monitoring power consumed by the circuits, the computer means being capable of storing information concerning the number of said circuits and being adapted to provide, from said power, a signal dependent on the mean power dissipation of the circuits; and in which oven the control means controls the heating of the circuits in dependence on said signal.

4,881,592

HEAT EXCHANGER WITH BACKMIX AND FLOW THROUGH PARTICLE COOLING

Ismail B. Cetinkaya, Palatine, Ill., assignor to UOP, Des Plaines, Ill.

Filed Feb. 1, 1988, Ser. No. 150,864
Int. Cl.[4] F28D *13/00, 19/02*
U.S. Cl. 165—104.16 **3 Claims**



1. A method for indirect heat exchange between fluidized particles and a heat exchange fluid comprising:

(a) collecting hot particles in a particle collection zone at a first elevation;

(b) transferring said particles through a particle inlet by gravity flow to the top of a heat removal zone located at a second elevation below said first elevation;

(c) fluidizing the particles in said heat removal, at least in part, by introducing a fluidizing gas into said heat removal zone;

(d) removing heat from the particles in said heat removal zone by indirect heat exchange with a heat transfer fluid in a first section where particles flow from the inlet to an outlet located in a central portion of said heat removal zone and a second section below the inlet and outlet having no net particle flow; and,

(e) recovering relatively cool particles from said heat removal zone through said outlet and pneumatically transporting said particles from said outlet to said first elevation.

4,881,593

HEAT CONDUCTING DEVICE

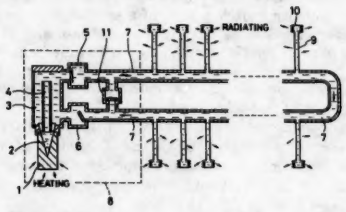
Kenji Okayasu, 20-15, Mukai-machi, Gyoda-shi, Saitama-ken, 361, Japan

Filed Dec. 22, 1988, Ser. No. 288,611
Claims priority, application Japan, Dec. 22, 1987, 62-324819
Int. Cl.[4] F28D *15/00*
U.S. Cl. 165—104.29 **2 Claims**

1. A heat conducting device having dream pipes for spatially transporting heat without circulation of liquid by repeating heat accumulation and radiation in a boundary layers formed on wall surfaces of flow passages by forward and rearward movement of liquid with vibration applied thereto, said conducting device comprising:

a flow passage or a chamber including a heat drive pump arranged to be operated by growth and contraction of steam bubbles in which each end of said dream pipes is

opened, wherein a power for forward and rearward moving said liquid in said dream pipes depends upon said heat



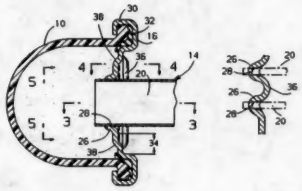
drive pump and another end of each of said dream pipes is designed to be telescopic.

4,881,594

HEADER PLATE FOR PRESSURE VESSELS, HEAT EXCHANGERS AND THE LIKE

Henry E. Beamer, Middleport, and William J. Buchanan, Olcott, both of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 27, 1989, Ser. No. 328,913
Int. Cl.[4] F28F 9/02
U.S. Cl. 165—173 **6 Claims**



1. A header plate for a pressure vessel, heat exchanger and the like, said plate having one side adapted to be exposed to one fluid and an opposite side adapted to be exposed to another fluid, said plate further having a first set of integral strengthening ribs, said plate further having a second set of integral strengthening ribs located between adjacent ones of the ribs in said first set, and the ribs in said second set each having one and only one tube receiving aperture therein and extending oppositely with respect to the ribs in said first set and adjoining the respective ribs in said first set so as to cooperatively extend their effective rib height.

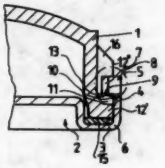
4,881,595

CLAMPING CONNECTION

Herbert Damsohn, Aichwald; Juergen Hoeing, Esslingen, and Lieselotte Heck, Gerlingen, all of Fed. Rep. of Germany, assignors to Sueddeutsche Kuehlerfabrik Julius Fr. Behr GmbH & Co. KG, Stuttgart, Fed. Rep. of Germany

Filed Sep. 30, 1988, Ser. No. 251,247
Claims priority, application Fed. Rep. of Germany, Sep. 30, 1987, 3732964
Int. Cl.[4] F28F 9/02
U.S. Cl. 165—173 **5 Claims**

1. A clamping connection comprising:
a plastic water tank equipped with at least one flange;
a heat-exchanger tube sheet carrying a deformable edge region; and
an elastic sealing means retained under prestress between said tank and said sheet, the deformable edge region, before its deformation, extending parallel to the outer contour of the flange and, after its deformation to make the clamping connection, having first partial regions deformed in an approximately wave-shaped manner over the flange of the plastic water tank, and non-deformed further partial regions extending parallel to the outer contour of the flange,
wherein the first partial regions are cut free parallel to and at a distance from an outer edge at the height of the flange



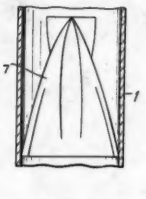
top edge and the lower edges of the deformed first partial regions rest on the top side of the flange under prestress, and wherein the top side of the flange of the plastic water tank has, at least partially, a sloping face in the region of the deformed first partial regions, wherein the sloping face descends toward the outer contour of the flange, and wherein the lower edges of the respective deformed first partial regions are deformed over this sloping face.

4,881,596

HEAT EXCHANGE PIPE FOR HEAT TRANSFER

Gyorgy Bergmann, Karpat u. 40, Budapest 1133; Gabor Csaba, 1021 Tosojato ut 100/b, Budapest II, and Géza Hivessy, 1151 Platan u. 4, Budapest XV, all of Hungary

Continuation of Ser. No. 40,638, Apr. 21, 1988, abandoned. This application Apr. 17, 1989, Ser. No. 339,893
Claims priority, application Hungary, Apr. 21, 1986, 1648/86
Int. Cl.[4] F28F 9/02; F15D 1/06
U.S. Cl. 165—174 **10 Claims**



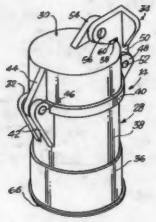
1. An insert usable in a heat exchange pipe for improving heat transfer in inhomogeneous media which flow in the pipe, said insert having a beginning, a middle, an end and a longitudinal length which is equal to 1–3 times the diameter of the pipe and comprising a continuous partition-wall part formed from sheet material, wherein the thickness of said partition-wall part is on the order of one-tenth to one-hundredth of the pipie diameter, and the surface of said partition-wall part situated along the flow is a three-dimensional surface having continuous curvature without any sharp changes of direction; whereby along the length of said insert, in place of a single-flow channel of the pipe, there are established at least two channels, completely separated from one another by the walls forming the insert, the walls bounding said channels being formed by said partition-wall part and by the wall of the pipe, the average radial distance of the flowing medium in at least one channel from the axis of the pipe being continuously variable from the beginning of the insert until the end of the insert.

4,881,597

ENVIRONMENTALLY SAFE LOCKING CAP FOR MONITORING WELL

Jerry C. Hensley, 6374 SW. 22nd Ct., Miramar, Fla. 33023

Filed May 17, 1988, Ser. No. 194,868
Int. Cl.[4] E21B *33/02*
U.S. Cl. 166—92 **10 Claims**



1. A cap for an environmental monitoring well, said well including a casing extending from an area below ground to be monitored, said casing being encased in grout, said cap comprising:

a base, including affixation means extending therefrom to form an environmentally safe seal with said well casing and further including a flange extending outwardly therefrom positioned downward from said affixation means at a position to be covered by said grout;

a cap hingedly affixed to said base at a position upward from said affixation means for permitting said cap to be rotated from an open position, allowing access to said casing through said base, to a closed position covering said base;

environmentally safe seal means between said cap, when in said closed position, and said base; and

mating first and second locking means affixed to said base and cap respectively to permit said cap to be locked in said closed position;

wherein said cap is affixed to a cap end of said base; and

wherein said base includes a ridge around an outer surface of said base, positioned remote from an upper edge of said base, against which said seal means is compressed by said cap when said cap is in said closed positioned, said cap being juxtaposed against said base from said seal means to said cap end when said cap is in said closed positioned.

4,881,598

BLOW-OUT PREVENTOR TEST TOOL

Michael P. Stockinger, Missouri City, Tex.; James R. Tietema, Gretna, and Lee S. Bass, New Iberia, both of La., assignors to Conoco Inc., Ponca City, Okla.

Filed Nov. 3, 1988, Ser. No. 266,971
Int. Cl.[4] E21B *41/00, 47/00;* G01M *3/08*
U.S. Cl. 166—250 **24 Claims**

1. Apparatus for testing a blow-out preventor system designed to close upon a smaller first tubular member and a larger second tubular member, said apparatus comprising:

an inner elongated cylindrical testing mandrel having an outside diameter substantially equal to an outside diameter of said first tubular member;

an outer elongated cylindrical testing mandrel having an outside diameter substantially equal to an outside diameter of said second tubular member, said inner testing mandrel being telescopingly received within said outer testing mandrel; and

releasable locking means, operably associated with said inner and outer testing mandrels, for releasably locking said testing mandrels in one of a telescopingly extended position, and a telescopingly retracted position, whereby said blow-out preventor system can be tested against one of said testing mandrels, and for releasing said testing mandrels from said one position so that they can move to the other of said telescopingly extended position and said telescopingly retracted position whereby said blow-out preventor system can also be tested against the other of said testing mandrels without tripping said apparatus out of a well in which said blow-out preventor system is installed.

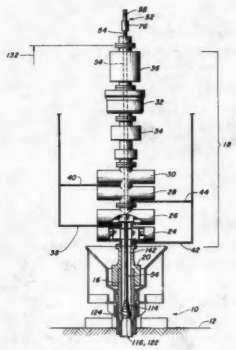
18. A method of testing a blow-out preventor system, said method comprising the steps of:

(a) providing a testing apparatus including inner and outer telescoping testing mandrels, said mandrels being telescopingly movable between a telescopingly extended position, with said inner mandrel extending downward below a lower end of said outer mandrel, and a telescopingly retracted position;

(b) providing a test plug connected to a lower end of said inner testing mandrel;

(c) lowering said testing apparatus and said test plug into a well until said test plug is located at a location below said blow-out preventor system;

(d) plugging said well with said test plug at said location;



(e) closing said blow-out preventor system against a first one of said inner and outer testing mandrels with said mandrels positioned in a first one of said extended and retracted positions and thereby defining a first enclosed zone between said blow-out preventor system and said test plug;

(f) pressurizing said first zone to perform a first test of an ability of said blow-out preventor system to seal against said first one of said inner and outer testing mandrels;

(g) telescopingly moving said testing mandrels to the other of said extended and retracted positions;

(h) closing said blow-out preventor system against said other of said inner and outer testing mandrel to define a second enclosed zone between said blow-out preventor system and said test plug;

(i) pressurizing said second zone to perform a second test of an ability of said blow-out preventor system to seal against said other of said inner and outer testing mandrels; and

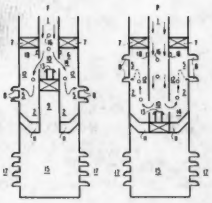
(k) wherein said testing apparatus and test plug remain in said well throughout steps (e)–(i).

4,881,599

MECHANICAL SYSTEM FOR DIVERSION IN THE ACIDIZING TREATMENT OF OIL FORMATIONS

Zadson d. A. Franco, and Demóstenis A. W. Barreto, both of Aracaju, Brazil, assignors to Petroleo Brasileiro S.A. - Petrobras, Rio de Janeiro, Brazil

Filed Mar. 29, 1988, Ser. No. 174,557
Int. Cl.[4] E21B *33/124, 33/13*
U.S. Cl. 166—284 14 Claims



1. An apparatus for supplying treatment fluid to at least one perforation contained in an oil well casing comprising:

a production string;

a packer, disposed above the at least one perforation to be treated, for fixing said production string and for providing a hydraulic seal between said production string and the oil well casing;

washer cups, disposed below the at least one perforation to be treated, for providing a hydraulic seal between said production string and the oil well casing; and

a swivel disposed directly below said packer for turning said production string;

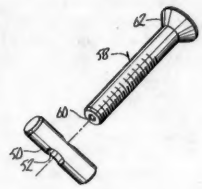
wherein said production string includes a centralized tail portion disposed between said packer and said washer cups, said centralized tail portion having a ball ejection port for introducing the treatment fluid from said producing string into an interval formed between said packer and said washer cups containing the at least one perforation.

4,881,600

HORSESHOE ASSEMBLY AND METHOD OF USING SAME

David J. Nebel, R.R. 3, Box 196A1, Dubuque, Iowa 52001

Filed Nov. 25, 1987, Ser. No. 125,366
Int. Cl.[4] A01L *3/00*
U.S. Cl. 168—11 6 Claims



1. A horseshoe assembly for shoeing the hoof of a horse, said hoof having an arcuate front surface and a bottom surface comprising an approximately U-shaped hoof wall having an outer edge and an inner edge, a sole located radially inwardly from inner edge of said U-shaped hoof wall, a substantially U-shaped white line located between said sole and said inner edge of said U-shaped hoof wall, and a frog located adjacent and between the U-shaped ends of said white line; said assembly comprising:

a substantially U-shaped base shoe having a closed forward end

and a pair of spaced apart legs extending rearwardly therefrom to terminate in spaced apart legs ends, said base shoe having an upper flat surface, a lower flat surface, an outer U-shaped edge, and an inner U-shaped edge, said outer U-shaped edge conforming in size and shape to said outer edge of said hoof wall;

an elongated strap means having opposite ends, strap attachment means operatively connecting said opposite ends of said strap means to said spaced apart legs of said U-shaped base shoe, said strap means extending upwardly from said spaced apart legs in an arcuate shape capable of retentive engagement with said arcuate front surface of said horse's hoof when said upper surface of said base shoe is in registered facing relation with said bottom surface of said horse's hoof;

said strap attachment means comprising a horizontal sleeve at each of said opposite ends of said strap means, said sleeve having a vertically registered pair of sleeve openings therein, an elongated threaded bolt having an upper end with a head thereon and a lower end with an Allen wrench receiving opening therein, said bolt extending through said vertically registered pair of sleeve openings with said lower end thereof protruding downwardly below said sleeve;

said base shoe having a pair of threaded tightening openings extending vertically therethrough in registered alignment below said pairs of sleeve openings in said sleeves at said opposite ends of said strap means; each of said tightening openings having an open upper end and an open lower end;

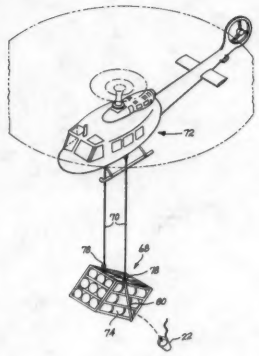
said lower ends of said threaded bolts extending within and threadably engaging said threaded tightening openings of said base shoe, said Allen wrench receiving openings of said bolts being accessible through said lower ends of said tightening openings.

4,881,601

APPARATUS FOR DEPLOYMENT OF AERIAL-DROP UNITS

Wayne D. Smith, 6017 122nd S.W., Tacoma, Wash.

Filed May 18, 1988, Ser. No. 195,212
Int. Cl.[4] A62C *27/30, 28/00;* B64D *1/02;* F41F *5/02*
U.S. Cl. 169—53 30 Claims



1. An apparatus for deployment of aerial-drop units, comprising:

a plurality of substantially parallel tubes each having upper and lower ends, each said tube being sized to hold a longitudinal stack of said units;

a carrier for said tubes suspendible from an aircraft;

releasable unit support element for each of said tubes; and

means for releasing said support elements, allowing each said stack, as its support is removed, to drop by gravity from the tube.

4,881,602

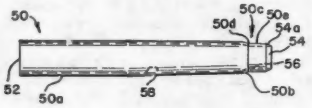
TURF AERATING TINE

Loren F. Hansen, and Mark L. Cozine, both of Lincoln, Nebr., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed Aug. 5, 1988, Ser. No. 228,984

Int. Cl.[4] A01B *45/02*

U.S. Cl. 172—22 **4 Claims**



1. A coring tine for use in a turf aerator machine having a plurality of such tines and designed to automatically cause said tines to undergo substantially longitudinal penetration into and retraction from a turf surface so as to form a pattern of generally cylindrical aeration holes in the turf surface as the machine traverses the surface, said tine comprising, an elongated, generally tubular and slightly tapered body having a discharge end and a turf penetrating end, a portion of said body including said turf penetrating end having a tapered configuration including a tapered shoulder portion and a narrowed neck portion, said neck portion including an interior core gripping surface with a diameter which is narrower than that of any portion of said body and said shoulder and being adapted to frictionally engage and retain a turf core upon longitudinal movement of said penetrating end into a turf surface and retraction therefrom, said neck portion terminating in a sharpened circumferential cutting edge.

4,881,603

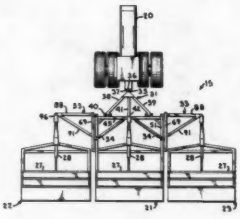
TOW FRAME

LeRoy Hartman, Rte. 2, Box 79A, Grainfield, Kans. 67737

Filed Dec. 19, 1988, Ser. No. 286,255

Int. Cl.[4] A01B *73/00*

U.S. Cl. 172—311 **15 Claims**



1. A folding frame for towing first and second implements, which comprises:

(a) a primary subframe including:

(1) a front, transverse drawbar with opposite ends;

(2) a side member extending rearwardly from one of said drawbar ends; and

(3) hitch means adapted for hitching one of said implements to said drawbar;

(b) a wing subframe including:

(1) a proximate end pivotally connected to said primary subframe side member; and

(2) a distal end including hitch means adapted for hitching said second implement to said wing subframe distal end;

(c) said wing subframe being pivotable about its proximate end with respect to said primary subframe between a field position with said wing subframe extending substantially laterally from said primary subframe and with said implements being substantially transversely aligned, and a transport portion with said wing subframe trailing its connection with said primary subframe and with said second implement located at least partly behind and trailing said first implement; and

(d) connector means adapted for lockably connecting said wing subframe to said primary subframe with said wing subframe in its field position.

4,881,604

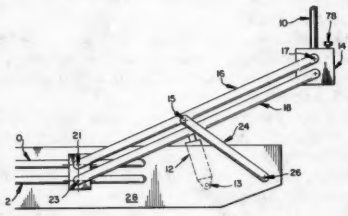
COMPUTER AIDED ANTI-BUCKLING DEVICE FOR MINE ROOF BOLTING MACHINES

William C. Orthwein, P.O. Box 3332, Carbondale, Ill. 62902

Filed Apr. 21, 1987, Ser. No. 41,010

Int. Cl.[4] B23Q *15/00*; F21C *5/16*

U.S. Cl. 173—11 **24 Claims**



1. An apparatus, comprising:

a mine shaft roof bolting machine for drilling holes into a mine shaft roof, said bolting machine comprising a torque motor, means capable of holding an elongated implement for rotation by said torque motor, and means for applying an upward thrust to said torque motor and elongated implement; and

means for operating said applying means comprising:

means for determining the length of said elongated implement exposed below said mine roof comprising at least one ultrasonic transceiver mounted for movement with said torque motor for directly measuring the distance between said torque motor and said mine roof through a signal reflected off said mine roof;

means responsive to said length determining means for calculating a maximum thrust that can be applied to an unconstrained length of said elongated implement between the mine roof and the torque motor of the bolting machine without causing a buckling failure of said elongated implement; and

means responsive to said calculating means for controlling said applying means to maintain said upward thrust at a level at least as low as said maximum thrust.

4,881,605

STABILIZING AND DRILLING APPARATUS AND METHOD

Tommy M. Warren, Coweta; Warren J. Winters, and Jame F. Brett, both of Tulsa, all of Okla., assignors to Amoco Corporation, Chicago, Ill.

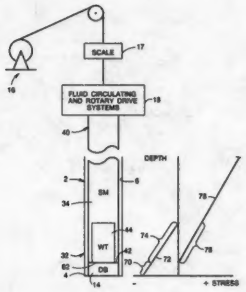
Filed Sep. 15, 1988, Ser. No. 244,767

Int. Cl.[4] E21B *17/16*

U.S. Cl. 175—320 **4 Claims**

1. A drill collar assembly adapted to form part of a drill string used in drilling a borehole in the earth, comprising:

one or more elongated outer tubular members having connection means at both ends each thereof for interconnection one to another, a lower-most tubular member interconnectable with a drill bit and the lower-most turbular member including an interior weight transfer shoulder; and



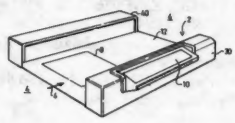
one or more free-standing weighting members disposed within the tubular members, a lower-most weighting member being adapted to rest upon the interior shoulder of the lower-most tubular member.

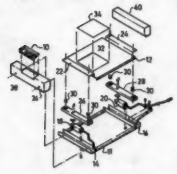
4,881,606

POINT-OF-SALE APPARATUS

Yosef Halfon, Kfar Saba, and Uzi Hadar, Kibbutz Beit Keshet, both of Israel, assignors to Shekel Electronics-Scales Beit Keshet Electronics (Registered Partnership), Lower Galilee, Israel

Filed Jan. 25, 1989, Ser. No. 301,413
Claims priority, application Israel, Jul. 15, 1988, 87114
Int. Cl.[4] G01G *21/00, 21/28, 19/00*
U.S. Cl. 177—126 **20 Claims**





1. Point-of-sale apparatus to be used with an optical scanner for identifying the articles sold, comprising:

a housing to be placed over the optical scanner;

a light-transparent window carried by said housing so as to be aligned with the optical scanner when the housing is placed thereover;

a weighing scale carried by said housing to weigh the article identified by the optical scanner;

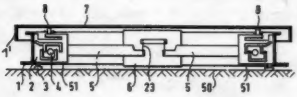
and a display for displaying the weight and/or the price of each article identified by the optical scanner and weighed by the weighing scale.

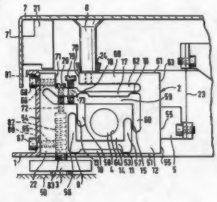
4,881,607

PLATFORM SCALE

Konrad Backu, Albstadt-Ebingen, Fed. Rep. of Germany, assignor to August Sauter GmbH, Albstadt-Ebinge, Fed. Rep. of Germany

Filed Mar. 10, 1989, Ser. No. 321,863
Claims priority, application Fed. Rep. of Germany, Mar. 11, 1988, 3808232
Int. Cl.[4] G01G *21/08, 21/10*
U.S. Cl. 177—256 **20 Claims**





1. A platform scale having a load platform for receiving articles to be weighed, a force sensor for generating a measuring signal related to the weight of articles to be weighed, and a lever arrangement supported on a basic frame substantially rectangular in shape in the plane of the frame and having two opposite lateral sides, the plane being parallel to the plane of the load platform, wherein on the input side of the scale the load platform is supported vertically on the lever arrangement for transmitting the force corresponding to the weight of articles to be weighed, and on the output side the lever arrangement is coupled to the force sensor by at least one force-transmitting arm, the improvement in the lever arrangement comprising:

a single-piece force-transmitting member disposed in each corner region of the basic frame, each single-piece force transmitting member comprising an anchoring member attached to a lateral side of the basic frame, a load-bearing member extending substantially parallel and in horizontal spaced relationship relative to said anchoring member, an upper and a lower link member disposed in vertical spaced relationship with respect to each other and between said anchoring member and load-bearing member, thin strip members disposed at the corners of a parallelogram and connecting said link members to said anchoring member and said load-bearing member so that said load-bearing member is supported and guided by said thin strip members and link members for parallel movement relative to said anchoring member, a free inner space between said anchoring member, load-bearing member and link members, a lever member disposed in said free inner space, and two additional thin strip members connecting said lever member to said anchoring member and said load-bearing member;

a connecting member extending along and adjacent to each lateral side of the basic frame and rotationally rigidly coupling together said single-piece force-transmitting members attached to the same lateral side of the basic frame;

a force sensor means between the opposite lateral sides; and

a force-transmitting arm connected to each connecting

member and extending therefrom toward and in operative engagement with said force sensor means.

4,881,608

COORDINATES INPUT SYSTEM TO DATA TRANSMITTER

Shinnichirou Otsuki, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 127,774, Dec. 1, 1987, abandoned. This application Mar. 27, 1989, Ser. No. 328,707

Claims priority, application Japan, Dec. 16, 1986, 61-297773; Dec. 16, 1986, 61-297774

Int. Cl.[4] G08C *21/00*

U.S. Cl. 178—18 **12 Claims**

1. A coordinates input system which is connected to a data transmitter, said system comprising:

coordinates input means, comprising a plate, for detecting coordinate values which are input onto said plate;

a sheet member set on said plate, said sheet member bearing a collection of instructions for the data transmitter;

instructing means for outputting a signal representing an instruction from said collection of instructions on said sheet member which instruction corresponds to said coordinate values;

control means for receiving the signals and for outputting the instructions to the data transmitter; and

synthesizing means for receiving graphic data from said coordinates input means and synthesizing the graphic data with an original to be transmitted by the data transmitter.

4,881,609

SUSPENSION MECHANISM FOR A TRACK-TYPE VEHICLE

Robert J. Purcell, Washington, and Robert R. Farris, Peoria, both of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Filed Dec. 22, 1987, Ser. No. 136,884

Int. Cl.[4] B62D *5/06, 5/12*

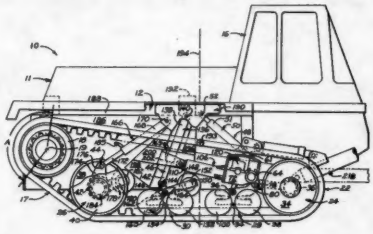
U.S. Cl. 180—9.5 **14 Claims**

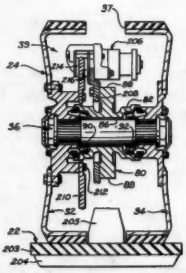
1. A suspension mechanism for a vehicle having frame, including a front idler wheel, a rear drive wheel connected to the frame, and an elastomeric drive belt entrained about the wheels and driven by the rear wheel, comprising:

suspension means for resiliently biasing the front idler wheel downwardly, for resiliently biasing the front wheel forwardly and obtaining the desired tension of the drive belt, and for providing the desired recoil of the front idler wheel with respect to the frame, the suspension means including a front member (rotatably) supporting the front idler wheel;

the front idler wheel including an axially inner side portion, an axially outer side portion, and shaft means for releasably connecting the side portions together; and

brake means for braking movement of the vehicle by selective engagement with the front idler wheel, the brake means being mounted on the front member of the suspension means, and wherein the brake means are disposed in





protected location between the side portions of the front idler wheel.

4,881,610

GUIDE FOR HOT AIR FROM RADIATOR IN FOUR WHEELED VEHICLE OPERATED BY DRIVER IN SITTING POSTURE

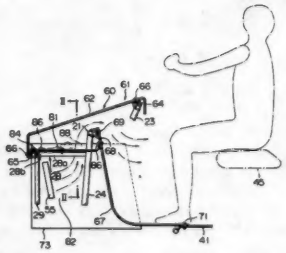
Hideyoshi Kosuge, Hyogo, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha, Japan

Filed Dec. 22, 1987, Ser. No. 136,545

Claims priority, application Japan, Dec. 27, 1986, 61-200484[U]

Int. Cl.[4] B60H *1/00*; B60K *11/00*

U.S. Cl. 180—68.2 **11 Claims**



1. A four wheeled vehicle operated by a driver in a sitting posture, comprising:

an elongated main frame structure;

a pair of front wheels and a pair of rear wheels mounted

respectively adjacent longitudinal front and rear end portions of said main frame structure;

a liquid-cooled engine mounted on said main frame structure;

a radiator mounted on the front end portion of said main frame structure for radiating heat from engine cooling liquid to air passing through said radiator to cool the cooling liquid;

a front body mounted on the front end portion of said main frame structure so as to cover said radiator, said front body including an upper body member of a generally inverted U-shaped cross-section having a top panel section and a pair of side panel sections depending respectively from opposite sides of said top panel section and located respectively adjacent said pair of front wheels, and a pair of cover members formed from an elastic material and covering respectively said pair of front wheels, each of said cover members being of a generally inverted L-shape having a top panel section and a side panel section depending therefrom, the top panel section of each of said cover members being located above a corresponding one of said pair of front wheels and connected to a corresponding one of said pair of side panel sections of said upper body member, the side panel sections for the respective cover members being positioned between said pair of front wheels respectively adjacent them;

a driver's seat mounted on said main frame structure at a location rearward of said front body;

a plate member extending between the side panel sections of the respective cover members and cooperating with the side panel sections of the respective cover members to define a guide passage for guiding hot air having passed through said radiator toward said driver's seat; and

a partition movable between an open position where said partition opens said guide passage to permit the hot air having passed through said radiator to flow toward said driver's seat and a closed position where said partition closes said guide passage to prevent the hot air having passed through said radiator from flowing toward said driver's seat.

4,881,611

ABNORMALITY DETECTOR FOR MOTOR ASSISTED STEERING APPARATUS

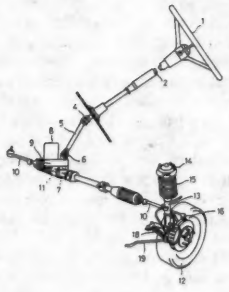
Hiroshi Nakashima, Nishio; Naoji Sakakibara, Chiryu, and Takehiko Fushimi, Kariya, all of Japan, assignors to Aisin Seiki Kabushikikaisha, Kariya, Japan

Filed Jan. 21, 1988, Ser. No. 146,742

Claims priority, application Japan, Jan. 22, 1987, 62-13048

Int. Cl.[4] B62D *5/04*

U.S. Cl. 180—79.1 **20 Claims**



13. An abnormality detector for detecting an abnormality in a motor assisted steering apparatus, the apparatus comprising:

a steering mechanism for adjusting the orientation of wheels with respect to a car body;

an input means for manually inputting a steering force to adjust the wheels with respect to the car body;

an input detecting means for detecting steering force information indicative of the magnitude of the steering force manually input to the input means;

an electric motor producing a drive force;

an energization control means for controlling the energization or deenergization of the electric motor in accordance with at least the steering force information from the input detecting means;

a transmission mechanism for transmission to the steering mechanism the steering force manually input to the input means combined with the drive force produced by the electric motor;

an operation condition detecting means for detecting operation information indicative of an operational condition of the electric motor;

an abnormality annunciator means for annunciating the existence of an abnormality in the event a relationship between the steering force manually input to the input means, and the operation information detected by the operation condition detecting means deviates from the predetermined relationship;

the energization control means energizing the electric motor for rotation in a forward direction when the steering force information from the input detecting means indicates the use of a steering force which turns the wheels to the right with respect to the car body, and energizing the electric motor for rotation in a reverse direction when the steering force information from the input detecting means indicates the use of a steering force which turns the wheels to the left with respect to the car body; and

the abnormality annunciator means annunciating the existence of an abnormality when the steering force information from the input detecting means indicates the use of a steering force which turns the wheels to the right with respect to the car body and when the operation information from the operation condition detecting means indicates that the motor is energized for rotation in the forward direction, or annunciating the existence of an abnormality when the steering force information from the operation condition detecting means indicates the use of a steering force which turns the wheels to the left with respect to the car body and when the operation information from the operation condition detecting means indicates that the motor is energized for rotation in the reverse direction.

4,881,612

STEERING APPARATUS FOR A VEHICLE

Kazuhiko Yano, Toyonaka; Shigenori Sakikawa, Itami, and Toshiaki Okanishi, Kobe, all of Japan, assignors to Kanzaki Kokyukoki Mfg. Co. Ltd., Japan

Filed Jan. 19, 1988, Ser. No. 144,974

Claims priority, application Japan, Jan. 22, 1987, 62-7865[U]; Feb. 6, 1987, 62-16820[U]

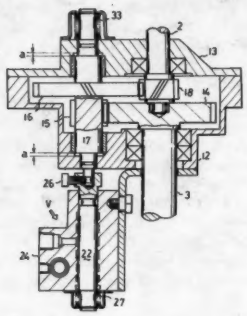
Int. Cl.[4] B62D *5/06, 5/07, 5/087*

U.S. Cl. 180—132 **4 Claims**

4. A steering system for a vehicle as set forth in claim 3, wherein said first gear train and said second gear train include said means for axially moving said counter shaft, said means comprising helical gears;

said helical gear of said first gear train having gear teeth which are disposed in an opposite direction of gear teeth of said helical gear of said second gear train whereby the

axial force on said counter shaft is increased as a result of the difference in relative rotation between said handle



shaft and said side shaft, thereby causing axial motion which controls said hydraulic valve.

4,881,613

FOUR-WHEEL STEERING APPARATUS FOR VEHICLE

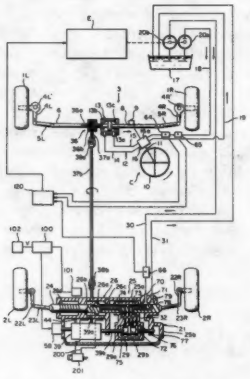
Hirotaka Kanazawa, Hiroshima; Koushun Note, Higashhiroshima, and Yasuhiro Nakashima, Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Apr. 22, 1988, Ser. No. 184,984

Claims priority, application Japan, Apr. 23, 1987, 62-102775

Int. Cl.[4] B62D *5/06*

U.S. Cl. 180—140 **12 Claims**



1. A four-wheel steering apparatus for a vehicle, including:

a vehicle engine;

a manually operated steering member for producing steering movements in front and rear wheels of the vehicle through front and rear wheel steering means;

a first power assist means actuated by an oil pump driven by the vehicle engine included in said front wheel steering means;

a second power assist means actuated by an oil pump driven by the vehicle engine included in said rear wheel steering means;

biasing means for returning the rear wheels to a neutral position;

first oil pressure detecting means for sensing the oil pressure in the first power assist means;

second oil pressure detecting means for sensing the oil pressure in the second power assist means; and

control means for increasing engine output power by a first predetermined amount when an oil pressure rise signal from said first oil pressure detecting means is received, and for increasing engine output power by a second predetermined amount which is different from the first predetermined amount when both an oil pressure fall signal from said first oil pressure detecting means and an oil pressure rise signal from said second oil pressure detecting means are received.

4,881,614

MOTORCYCLE

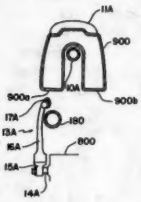
Norio Hoshi; Tetsuro Yamaguchi, both of Saitama; Yasuhiro Okada, Tokyo, and Takao Matsukawa, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 16, 1988, Ser. No. 156,021

Claims priority, application Japan, Feb. 16, 1987, 62-31511; Feb. 17, 1987, 62-20744[U]; Feb. 17, 1987, 62-20745[U]

Int. Cl.[4] B62D *61/02*; B62M *7/06*

U.S. Cl. 180—225 **8 Claims**



1. A motorcycle exhaust pipe arrangement comprising:

a frame including a head pipe, a main pipe, a down tube, at least one under pipe and a pair of center pipes;

a space being defined between said pair of center pipes;

a fuel tank operatively connected to said main pipe;

an engine mounted on said at least one under pipe and being disposed beneath said fuel tank;

a seat mounted adjacent said fuel tank and being disposed above said engine;

a rear shock absorber operatively mounted between said main pipe and a rear fork for absorbing shock supplied to said main pipe, said rear shock absorber being centrally disposed relative to a longitudinal axis of said motorcycle;

an exhaust pipe connected to said engine and extending rearwardly therefrom, said exhaust pipe being disposed substantially at a side of said rear shock absorber and extending substantially horizontally therefrom in said longitudinal direction of said motorcycle for lowering the center of gravity of said motorcycle and providing a symmetrical rigid frame for supporting said engine, fuel tank and seat; and

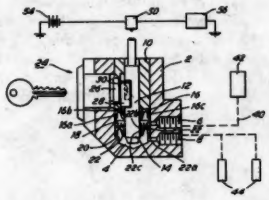
a kick operating starter device having a pivot portion and an arm portion, said pivot portion being operatively connected to said engine, said exhaust pipe being disposed within an area adjacent to said arm portion for enabling said kick operating starter device to be positioned directly adjacent to said engine in an inoperative position.

4,881,615

ANTI-THEFT DEVICE FOR MOTOR VEHICLES

Robert Conway, 12 Tweed Grove, Lemington, Newcastle upon Tyne NE15 8EX, England

Filed Nov. 28, 1988, Ser. No. 276,777
Claims priority, application United Kingdom, May 27, 1987, 8712384; May 23, 1988, 8812140
Int. Cl.[4] B60K 27/00
U.S. Cl. 180—287 7 Claims



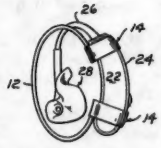
1. An anti-theft device for a motor vehicle having a hydraulically operated braking system, said system comprising a hydraulic pressure supply means and a brake operating means for actuation by pressure fluid from said supply means, a pressure fluid path extending between said supply and operating means, the device being disposed in said fluid path and comprising a valve body, inlet and outlet ports in said body for connection to the supply means and the operating means respectively, a fluid flow path in said body between said ports, a flexible sealing ring mounted within the body defining an orifice in said path, a closure member slidably supported in said body for displacement coaxially of the sealing ring into and out of engagement therewith, said sealing ring comprising an annular portion projecting radially inwards from a fixed seal support in said body, and a radially inner portion extending axially from said annular portion in the direction of flow along said fluid flow path from the inlet port to the outlet port, by said coaxial displacement the closure member being removably inserted into sealing engagement with said axially extending portion of the sealing ring to close said fluid flow path, said axially extending portion being resiliently deformable by the application of hydraulic pressure through the inlet port whereby it allows the passage of pressure fluid past said closure member to the outlet port but is urged more firmly into sealing contact with said closure member when the outlet port pressure is greater than the inlet port pressure.

4,881,616

HEARING AID RETENTION APPARATUS

Gwen V. Janssen, and Roy C. Rowland, both of 837 NW. 10, Oklahoma City, Okla. 73106

Filed Apr. 7, 1989, Ser. No. 335,079
Int. Cl.[4] H04R 25/00
U.S. Cl. 181—129 5 Claims



1. In a normally ear auricle supported hearing aid having an elongated housing arcuately curved longitudinally and adapted to be supported generally longitudinally upright in a space between the auricle and head of a user adjacent a rearward upper limit of a juncture of the ear auricle with the head by a conductor member extending, in inverted generally J-shaped hook fashion across a forward and upper limit of an ear helix juncture with the head, between an upper limit of the housing and a hearing aid ear mold disposed in an ear fossa, the improvement comprising:

an elongated flexible member snugly surrounding the major forward, upper and lower portion of the ear auricle at the juncture with the head of the user's head; and,

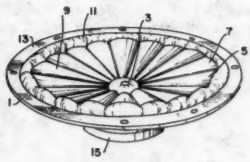
resilient means attached to said flexible member for connecting the end portions of said flexible member with respective end portions of said hearing aid housing.

4,881,617

RADIALLY ARCUATED SPEAKER CONE

Alexander Farsone, R.D. #2, Box 75 A, Frenchtown, N.J. 08825

Filed Dec. 30, 1988, Ser. No. 292,339
Int. Cl.[4] G10K 13/00
U.S. Cl. 181—164 10 Claims



1. In an acoustic speaker having a center, having a transducer located at said center and having a cone for conversion of electromechanical energy to sound located about said transducer, the improvement which comprises:

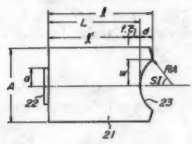
a cone having a plurality of thin, pie shaped segments which radiate outwardly from said transducer, each of said segments having an arcuated cross-section, thereby creating a concave side and a convex side to each such segment, all of said concave sides of said segments facing one direction and all of said convex sides of said segments facing an opposite direction, and further wherein said arcuated segments have a highly concave cross section at the transducer and a less concave cross-section with increasing radial distance from the center of the speaker.

4,881,618

ACOUSTIC LENS FOR USE IN ACOUSTIC MICROSCOPE

Hitoshi Tateoka, Ohme, and Fumio Uchino, Hachioji, both of Japan, assignors to Olympus Optical Co., Ltd., Japan

Filed Jun. 2, 1987, Ser. No. 56,685
Claims priority, application Japan, Jun. 6, 1986, 61-131511
Int. Cl.[4] G10K 11/06
U.S. Cl. 181—176 7 Claims



1. An acoustic lens for use in an acoustic microscope, comprising:

a solid state medium for prepagating an acoustic wave having a wavelength λ, said solid state medium including

opposed end surfaces separated from each other by a length l;

an electric-acoustic piezoelectric transducer applied on one end surface of said solid state medium and having a radius a; and

a lens portion formed in the other end surface of said solid state medium in coaxial arrangement with said transducer and having an aperture radius w;

whereby the dimensions of said acoustic lens are further defined by a ratio $l\lambda/a^2$, represented by a variable Z, and a ratio w/a, represented by a variable W, wherein Z is equal to a positive value less than 1 and W is equal to a positive value other than 1, and Z and W are not contemporaneously equal to 1/5 or ½, such that an acoustic field having desired power and/or phase can be obtained in the solid-state medium.

4,881,619

DEVICE FOR BARRING ACCESS TO THE TOP OF A VERTICAL TUBULAR DUCT

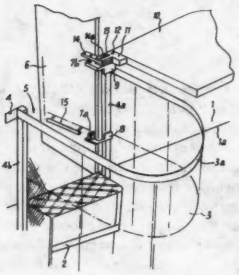
Charles Coutier, Thionville-Garches, France, assignor to Coutier Industrie, France

Filed Oct. 25, 1988, Ser. No. 261,873

Claims priority, application France, Oct. 30, 1987, 87 15115

Int. Cl.[4] E06C *9/10, 5/36*

U.S. Cl. 182—77 **9 Claims**



1. A device for closing a substantially vertical tubular duct provided with ladder rungs, wherein the device includes a closure member which is retractable by pivoting about a fixed vertical hinge axis provided to one side of the rungs, and means for rotating and for locking the closure member, said means comprising an operating lever pivotally mounted about a second fixed vertical axis adjacent to the above-mentioned axis, and coupled to rotate with the closure member.

4,881,620

FOUR-LEG TRESTLEWORK STRUCTURE FOR SUPPORTING AN OFF-SHORE PLATFORM

Alberto Agostoni, Lissone; Alfredo D'Agostino, Gallarate; Enrico Craighero, Varese, and Renzo Marazza, Milan, all of Italy, assignors to Tecnomare S.p.A., Venice, Italy

Filed Jun. 2, 1988, Ser. No. 201,216

Claims priority, application Italy, Jul. 15, 1987, 21288 A/87

Int. Cl.[4] E04G *1/04*

U.S. Cl. 182—179 **4 Claims**

1. An improved, four-legged obelisk shaped trestlework structure for supporting an off-shore platform comprising:

an obelisk frame having ends and sides, said frame having a bottom base area, a middle area and a top end area and four tapered main leg members;

said four tapered main leg members having a lower section, a middle section and an upper section where said lower section is larger than said middle section and said middle section is larger than said upper section;

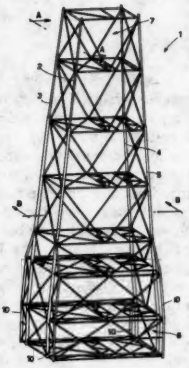
said bottom base area comprising two mutually opposite inclined plane side faces, two mutually opposite side faces, one bottom face and said lower section of said four tapered main leg members and correspondingly four main trestlework appendices;

said four tapered main leg members of said bottom base area are connected to each other by crossbeams and tie-rods and run upward from said bottom face;

said four tapered main leg members of said bottom base area are positioned parallel to each other on said two mutually opposite inclined plane side faces;

said middle area comprising two mutually opposite inclined plane side faces, two mutually opposite side faces and said middle section of said four tapered main leg members;

said four tapered main leg members of said middle area are connected to each other by crossbeams and tie-rods and run upward from the top of the four tapered main leg members of said bottom base area;



said four tapered main leg members of said middle area are positioned parallel to each other on said two mutually opposite inclined plane side faces;

said top end area comprising two mutually opposite inclined plane side faces, two mutually opposite side faces, one top face and said top end area of said four tapered main leg members;

said four tapered main leg members of said top end area are connected to each other by crossbeams and tie-rods and run upward from the top of the four tapered main leg members of said middle area;

said four-tapered main leg members of said top end area are positioned parallel to each other on said two mutually opposite inclined plane side faces; and

said top face matches the plan of said off-shore platform.

4,881,621

SPIRAL SPRING POWER SOURCE FOR TOY

Minoru Ishida, Tokyo, Japan, assignor to Marusan Co., Ltd., Tokyo, Japan

Filed May 25, 1988, Ser. No. 198,562

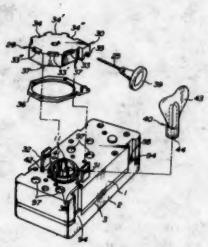
Claims priority, application Japan, May 30, 1987, 62-136009

Int. Cl.[4] F03G *1/08*

U.S. Cl. 185—39 **5 Claims**

1. In combination with a power source for toys comprising a housing which includes therein a spiral power spring assembly, a wind-up shaft extending from the housing for winding up the spring assembly, and an output shaft connected with the spring assembly for rotation thereby when the spring assembly is released, a wind-up mechanism for the spring assembly comprising a wind-up casing, a winding ring journalled in the casing, a wind-up cord wound on the ring and having an outer

end accessible through an opening in the casing for exerting a pull on the cord to rotate the ring, connector means in the casing for providing a drive connection between said ring and said wind-up shaft for rotating the shaft when the cord is progressively drawn through said opening in the casing, a spring return mechanism in the casing for rewinding the cord on the ring by rotation of the ring upon release of the cord, and



releasable attachment means between the housing and the casing for selectively attaching the casing on the housing in different angular orientations of the casing relative to the housing and with said drive connection formed between the connector means and the wind-up shaft in each of said orientations whereby said cord can be drawn through said opening in different directions relative to said housing dependent on the selected orientation of the casing on the housing.

4,881,622

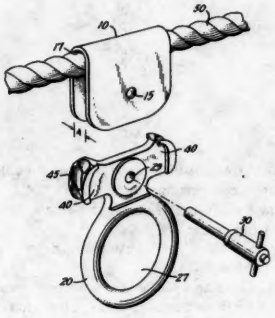
SAFETY GRAB PROTECTION DEVICE

Henry Machal, 380 Elkwood Ter., Englewood, N.J. 07631

Filed Mar. 1, 1988, Ser. No. 162,679

Int. Cl.[4] B65H *59/16*

U.S. Cl. 188—65.1 **9 Claims**



1. A safety grab protection device operable bi-directonally for connecting a safety belt lanyard to a vertical safety rope or the like comprising:

a clevis-like housing through which a safety rope can be reeved, a unitary brake cam for disposition between the ends of said clevis-like housing, said housing being apertured through its ends and said cam having a through bore for alignment with said housing apertures,

a removable pin for insertion through said apertures and said bore to pivotally join said cam to said housing, said cam having arms extending to either side of said bore normal to the axis of said bore which arms are selectively articulable about said bore as a pivot into bi-directional apposition with the bight of said housing for alternative wedging a rope against said bight, and

a rope engaging intaglio formation at the ends of each said arms where said intaglio formation is a curved, knurled intaglio image of a helically intertwined safety rope.

4,881,623

DISK BRAKE ASSEMBLY

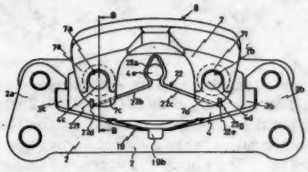
Toshio Kondo, Okazaki, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Continuation of Ser. No. 143,041, Jan. 12, 1988, abandoned. This application Apr. 10, 1989, Ser. No. 336,611

Claims priority, application Japan, Jan. 12, 1987, 62-002759

Int. Cl.[4] F16D *65/40*

U.S. Cl. 188—73.38 **3 Claims**



1. A disk brake assembly comprising:

a rotary brake disk rotatable with a wheel in a body;

a mounting member fixed to a stationary member of a vehicle;

a guide member positioned parallel with respect to an axial direction of said brake disk and fixed at one end portion to said mounting member;

a caliper member having a tubular portion slidably supported on said guide member to be movable in an axial direction, said caliper member straddling a portion of said brake disk and having a fluid actuator provided with a piston on one side thereof to press an inner brake pad against one face of said brake disk and a reaction portion on an opposite side thereof to press an outer brake pad against an opposite face of said brake disk;

said outer brake pad having a projection portion projected axially outwardly of said brake disk at a center of its backing plate between nail portions of said reaction portion of said caliper member;

a spring member disposed between said outer brake pad and said reaction portion of said caliper member and rigidly supporting said outer brake pad on said caliper member; and

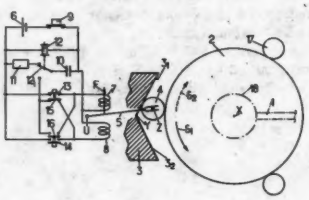
said spring member urging said outer brake pad axially outwardly of said brake disk and having a center clipping portion rigidly and elastically clipped to said projection portion of said outer brake pad and having a pair of arm portions extending from said center clipping portion, said arm portions and said center clipping portion being substantially coplanar and said arm portions being engaged with inclined concave portions on an axially inner surface of said nail portions of said reaction portion of said caliper member, said arm portions having end portions elastically engaged with an axially outer surface of said nail portions of said reaction portion at ends of said arm portions, said center clipping portion having a diameter that is decreased as a result of the force produced by the elastic engagement of the end portions of the spring member with the axially outer surface of said nail portions, said spring member urging said outer brake pad toward a center section of said brake disk and substantially equalizing an elastic force operating on the outer brake pad.

4,881,624

ANGULAR ANTI-RETURN DEVICES ASSOCIATED WITH TURNSTILES

Jean-Pierre Ulmann, Paris, France, assignor to Etablissements Georges KLEIN, Paris, France

Filed Jun. 24, 1988, Ser. No. 211,313
Claims priority, application France, Jul. 2, 1987, 87 09395
Int. Cl.[4] F16D *63/00*
U.S. Cl. 188—82.2 10 Claims



1. Dual action angular anti-return device associated with a turnstile and comprising a drum of revolution of axis X fast to the turnstile and coaxial with the latter, a fixed vee whose bisector plane contains the axis X of the drum, said vee being open on the side of said drum and positioned a short distance from the latter, a roller of axis parallel with the axis X, interposed between the vee and the drum and mounted so that, on a moveable support, it can be moved between a first end position for which it is blocked by wedging between the drum and one face of the vee and a second end position for which it is blocked by wedging between the drum and the other face of the vee, two electromagnets associated with the support of the roller so as to urge this support respectively in two reverse directions on their respective energizations, a source of DC electric current and switch means enabling said source to be connected alternately to each of the electromagnets for its supply, or to neither of them, said device comprising in addition an electric capacitor mounted so as to be charged by the source each time that either of the two electromagnets is supplied by this source and to be automatically discharged into the other electromagnet as soon as said supply is interrupted; the discharge from the capacitor causing the other electromagnet to momentarily energize and attract the support, thereby causing the roller to more rapidly assume a neutral, non-blocking position.

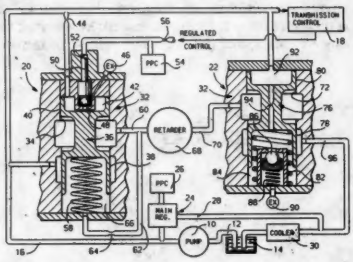
4,881,625

CONTROL VALVING FOR A HYDRAULIC RETARDER

James A. Redelman, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 27, 1988, Ser. No. 211,623
Int. Cl.[4] F16D *57/06*; B60K *41/20*
U.S. Cl. 188—290 2 Claims

1. An improvement in hydraulic retarder cooling and torque capacity in a hydraulic transmission having a source of fluid pressure; a main pressure regulator for normally maintaining the pressure level of said source; a hydraulic retarder; means for controlling the operation of said retarder; and cooler means for cooling the fluid wherein the improvement comprises: inlet valve means for controlling inlet fluid flow to said retarder; outlet valve means for controlling the outlet fluid flow from the retarder to the cooler, said outlet valve means having control valve means in fluid communication with said source for preventing fluid outlet flow from said retarder when the fluid pressure of the source is below a predetermined level, and



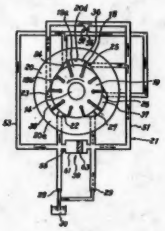
control valve means on said inlet valve means for controlling the inlet pressure to said retarder.

4,881,626

POWER TRANSMISSION APPARATUS FOR VEHICLE OF FOUR-WHEEL DRIVE TYPE

Takeo Hiramatsu, Nagaokakyo, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Japan

Continuation of Ser. No. 88,059, Aug. 21, 1987, abandoned. This application Jan. 24, 1989, Ser. No. 302,037
Claims priority, application Japan, Sep. 1, 1986, 61-205300
Int. Cl.[4] F16D *31/02*
U.S. Cl. 192—60 2 Claims



1. In a power transmission apparatus for a vehicle of four-wheel drive type comprising:

a first rotary shaft for transmitting drive force to front wheels of the vehicle,

a second rotary shaft for transmitting drive force to rear wheels of the vehicle,

a hydraulic oil pump used as a connecting means for connecting said first and second rotary shafts and driven by a difference in rotational speed between said first and second rotary shafts to deliver hydraulic oil of an amount depending on said difference in rotational speed and having a suction passage and a delivery passage to be changed over in dependence on relative rotational direction of said first and second rotary shafts, restricting means for restricting communication between said suction passage and said delivery passage to restrict pressure of hydraulic oil delivered from said hydraulic oil pump;

the improvement comprising:

a cylinder having axial ends and a continuous imperforate axial wall, said cylinder communicating at one of its axial end with said suction passage and communicating at its opposite axial end with said delivery passage;

an imperforate piston slidably disposed inside said cylinder and dividing said cylinder into a first expansion chamber

connected to said suction passage and a second expansion chamber connected to said delivery passage;

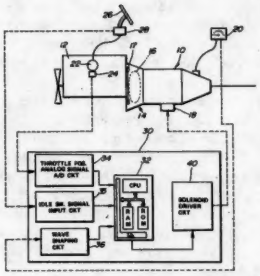
whereby, each of said chambers operate as an expansion chamber for reserving hydraulic oil to temporarily suppress increases in pressure of hydraulic oil delivered from said hydraulic oil pump.

4,881,627

CONTROL SYSTEM FOR AUTOMOTIVE TRANSMISSION ARRANGEMENT INCLUDING LOCK-UP CLUTCH

Shigeru Ishii, Atsugi, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Apr. 25, 1988, Ser. No. 185,407
Claims priority, application Japan, Jun. 26, 1987, 62-160423
Int. Cl.[4] F16H *45/02*
U.S. Cl. 192—0.076 **11 Claims**



6. In a system having a prime mover and a device assocated with said prime mover:

means for sensing the load on said prime mover;

means for determining the rate at which the load is changing;

means for sensing if the rate at which load is changing is within a first range;

means for sensing, in response to the rate being sensed as being within said first range, if the rate is within a second predetermined range which is narrower than said first range;

means for issuing a control signal to said device in the event that the rate at which load on the prime mover is changing is sequentially sensed as being within said first and second ranges.

11. In a system:

an internal combustion engine;

a transmission;

a clutch arrangement interconnecting said engine and said transmission, said clutch arrangement including a torque converter and a lock-up clutch; and

a control arrangement for selectively controlling said lock-up clutch, said control arrangement comprising:

a sensor for sensing a parameter which varies with one of (a) the torque produced by said engine and (b) the load on said engine;

a sensor for sensing the rotational speed of said transmission;

a circuit responsive to said first and second sensors for selectively producing a lock-up control signal, said circuit including means for:

sensing the magnitude of said parameter;

determining the rate at which the parameter magnitude is changing;

sensing if the rate at which the parameter magnitude is changing is within a first range;

sensing, in response to the rate being sensed as being within said first range, if the rate is within a second predetermined range which is narrower than said first range;

issuing a control signal to the control arrangement which controls said lock-up clutch in the event that the rate at which the parameter magnitude is changing is sequentially sensed as being within said first and second ranges;

sensing the magnitude of said parameter being below a predetermined minimum value; and

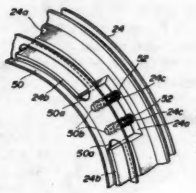
preventing the issuance of said control signal while the magnitude of said parameter is above said predetermined minimum value.

4,881,628

AUTOMATIC TRANSMISSION HAVING COAXIALLY OVERLAPPED CLUTCHES

Toshio Yamaguchi, Hatano, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jan. 13, 1988, Ser. No. 143,413
Claims priority, application Japan, Jan. 17, 1987, 62-8841
Int. Cl.[4] F16D *55/10, 25/06*
U.S. Cl. 192—85 AA **10 Claims**



1. An automatic transmission comprising:

a first means including a first drum with a closed bottom portion, and a first piston axially slidably received in said first drum to define a piston working fluid chamber in said first drum between said first piston and said closed bottom portion, said fist piston having a cylindrical outer wall portion which extends coaxially away from said closed bottom portion of the first drum;

a second means including a second drum coaxially received in said first drum in a manner to define between a cylindrical inner surface of said first drum and a cylindrical outer surface of said second drum a cylindrical clearance;

a clutch plate unit including drive and driven plates which are juxtaposed, said clutch plate unit being arranged within said cylindrical clearance and being compressed by a leading end of the cylindrical outer wall portion of said first piston upon application of fluid pressure to said piston working fluid chamber;

an annular spring retainer fixed at its outer peripheral portion to said cylindrical inner surface of said first drum, said annular spring retainer being formed with spaced slots;

means providing said cylindrical outer wall portion of said first piston with alternately arranged recesses and projections, said projections passing through said spaced slots and projecting toward said clutch plate unit to actuate the same; and

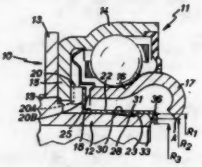
at least one return spring arranged in each of said recesses of the first piston having one end pressed on a bottom wall of the recess and the other end pressed on a solid portion of said annular spring retainer;

wherein said at least one return spring in each of said recesses and said projection lie in a common plane.

4,881,629
CLUTCH RELEASE BEARING

Christian Gay, Paris, and Philippe Lassiaz, Boulogne, both of France, assignors to Valeo, Paris, France

Filed Feb. 9, 1988, Ser. No. 154,103
Claims priority, application France, Feb. 17, 1987, 87 02000
Int. Cl.[4] F16D 23/14
U.S. Cl. 192—98 9 Claims

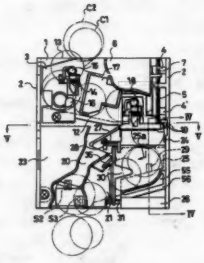


1. A clutch release bearing assembly comprising an operating element adapted to be subject to the action of a control device, and a drive element applied either directly or indirectly axially against said operating element and which said drive element is adapted to act on the release device of a clutch, said bearing assembly having an axis, said operating element having a transverse flange for the axial abutment of the drive element, and said drive element carrying transversely, for axial application to said flange, a flanged edge referred to hereinafter as an applied flanged edge; and an elastic washer adapted to apply said drive element to said operating element and to locate it axially with respect thereto, said elastic washer bearing axially on the drive element and having at least one lug provided with a transverse shoulder by which said elastic washer is retained by the operating element, said lug being prolonged beyond said transverse shoulder and being formed with a washer flange extending radially towards the axis of the assembly and beyond said shoulder.

4,881,630
COIN DISCRIMINATING APPARATUS

Osamu Kobayashi, Sakado; Osamu Sugimoto, Iruma; Yonezou Furuya, Saitama; Takeshi Ishida; Masanori Tanaka, both of Sakado, and Jun Ishii, Kawagoe, all of Japan, assignors to Nippon Conlux Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 56,335, May 22, 1987, abandoned, which is a continuation of Ser. No. 752,455, Jul. 5, 1985, abandoned. This application Sep. 2, 1988, Ser. No. 241,817
Claims priority, application Japan, Jul. 7, 1984, 59-101975
Int. Cl.[4] G07F 9/00, 3/02, 1/04
U.S. Cl. 194—203 2 Claims



1. A coin discriminating apparatus comprising:

a common coin path through which all inserted coins to be discriminated pass downward, said common coin path having a curved portion and extending obliquely of said apparatus to said curved portion at which the downward movement direction of a coin is changed, and then extending vertically of the apparatus;

a detection coil means arranged to oppose said common coin path for detecting the denomination of the coin and discriminating a counterfeit coin from an authentic coin;

a return coin path and a first authentic coin path each disposed at a location downstream of said common coin path, said return coin path and said first authentic coin path each extending vertically of said apparatus and defined between a plurality of plate members;

a plurality of second authentic coin paths each corresponding to an associated one denomination of coin, said second authentic coin paths being stacked with each other and with said return coin path and said first authentic coin path and defined between said plurality of plate members, said second authentic coin paths having an upper section which extends from said first authentic coin path and then extends obliquely and in a direction opposite to that of said common coin path;

a first solenoid operative in response to the discrimination of a counterfeit coin from an authentic coin by said detection coil means and a second solenoid operative in response to a detection of a denomination of a coin by said detection coil means;

a first selector means disposed at a location downstream of said curved portion of said common coin path for passing all of said inserted coins therethrough and for diverting counterfeit coins to said return path and authentic coins to said first authentic coin path, said first selector means being arranged for pivotal movement around a shaft extending horizontally of said apparatus and in a direction along which said second authentic coin paths, said return coin path and said first authentic coin path are stacked, so as to communicate said common coin path with said first authentic coin path and said return coin path when said first selector means is selectively operated by said first solenoid; and

a second selector means disposed at a location downstream of a lower curved portion of said first authentic coin path and downstream of said first selector means for passing only authentic coins therethrough and for sorting authentic coins by denomination into said second authentic coin paths, said second selector means being arranged for pivotal movement around a shaft extending vertically of said apparatus and in the direction along which said second authentic coin paths, said return coin path and said first authentic coin path are stacked, so as to direct the authentic coin to a corresponding one of said second authentic coin paths when said second selector means is operated by said second solenoid.

4,881,631
BREAKOVER HANDLE FOR PARKING METER

Seth Ward, II, Little Rock, Ark., assignor to POM Incorporated, Russellville, Ark.

Filed Jun. 9, 1988, Ser. No. 204,352
Int. Cl.[4] F16D 3/00; G05G 1/00
U.S. Cl. 194—228 1 Claim

1. A parking meter comprising:

a housing having a substantially open viewing region;

a coin operated timing mechanism disposed in said housing having coin slots for accepting coins therein and a calibrated display of indicating the amount of time corresponding to the monetary value of the inserted coins, said calibrated display viewable in said substantially open viewing region;

a shaft connected to said coin operated timing mechanism and extending along a longitudinal axis to the exterior of said housing and terminating in a radially enlarged flange having a first detent recess therein comprising a slotted aperture extending through said flange and spaced radially from said longitudinal axis and sized to accommodate

movement of a detent member only in a direction parallel to said longitudinal axis but to captivate the detent for rotatable movement with the flange;

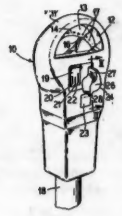
a cylindrical cup shaped receptor having an end wall intersecting the central axis thereof and a side wall extending axially and longitudinally with respect to said central axis for receiving said flange of said shaft, said end wall having a single second recess spaced radially inwardly of said side wall and selectably alignable with said first recess;

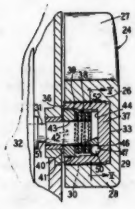
screw threads formed in the interior of said sidewall;

a spherically shaped detent member constructed and arranged to be complemental in size and shape for reception within said first and second recesses to join said shaft and said receptor in co-rotatable relationship with one another;

a cap having threaded sidewalls for engaging the screw threads in the interior of said sidewall of said receptor and an aperture in the center thereof constructed and arranged to pass said shaft therethrough;

spring means comprising a series of spring washers disposed radially about said shaft between the endwall of said receptor and said cap for bias loading said flange of said shaft against said endwall of said receptor; and





a manual activating handle having an aperture for receiving said receptor,

interfitting knurling means on said handle and said receptor locking them together in a co-rotatable relationship with said handle in a pre-aligned orientation relative to said viewing region,

said handle adapted for gripping by a human hand so that an operator of said parking meter upon turning said handle will apply normal torque to said receptor and said detent thereby to turn said shaft for activating said coin operated timing mechanism,

the application of excessive abnormal torque to said manual activating handle displacing said detent member longitudinally out of said second recess into said first recess against said end wall and against the bias of said spring means and allowing said handle and receptor to turn together without simultaneously turning said shaft thereby allowing said handle, said receptor and said detent to turn through a rotation of only 360 degrees before said detent once against engages said second recess so that said handle will return and remain in said pre-aligned orientation;

whereby the actuating handle is once again conditioned for normal action of the parking meter from its pre-aligned orientation.

4,881,632

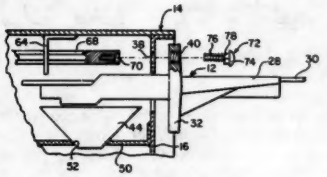
MOUNTING DEVICE FOR A COIN CHUTE ASSEMBLY

Anthony LiCausi, Middle Village, N.Y., assignor to Greenwald Industries Inc., Brooklyn, N.Y.

Filed Jul. 27, 1988, Ser. No. 224,738

Int. Cl.[4] G07F 9/00

U.S. Cl. 194—350 **3 Claims**



1. A lockable coin chute assembly comprising:

a housing including a wall having an opening therein and an aperture located adjacent to said opening;

a coin chute mechanism mounted on said housing, said mechanism including a chute flange engageable with said housing wall in the mounted position thereof and covering said housing wall opening, said chute flange having an aperture therein located in alignment with the aperture in said housing wall when said chute mechanism is in its mounted position on said housing;

a locking shaft supported within said housing, said shaft including a bearing surface having a transverse dimension greater than the corresponding dimension of the aperture in said housing wall, said shaft being positioned with its bearing surface in contact with an inside surface area of said housing wall surrounding the aperture thereof;

a headed member having an enlarged head portion and a shank portion extending from said head portion, said shank portion configured to extend through the aligned apertures in said chute flange and said housing wall with said head portion in contact with and bearing against an outer surface area of said chute flange surrounding the aperture thereof;

said headed member being made of hardened steel and having a portion configured to engage said chute flange to prevent rotation of said headed member relative to said locking shaft; and

interengaging fastening means associated with said locking shaft and said shank portion of said headed member for removably securing said coin chute mechanism in its mounted position on said housing.

4,881,633

MODULAR WORK INDEXING MACHINE AND METHOD OF CONSTRUCTING SUCH A MACHINE

Ronald J. Calley, Flint; John F. Nichols, Essexville, and Herman F. Heidtman, Bay City, all of Mich., assignors to RWC, Inc., Bay City, Mich.

Filed Sep. 28, 1987, Ser. No. 101,399

Int. Cl.[4] B65G 21/20

U.S. Cl. 198—345 **13 Claims**

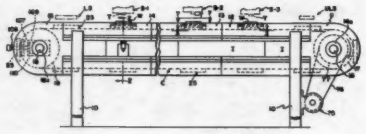
1. In a precision indexing conveyor system for moving workpieces incrementally along a longitudinal pathway from work station to work station:

a. a frame;

b. a pair of in-line sprockets at opposite ends of said frame;

c. an endless conveyor trained around said sprockets comprising longitudinally spaced apart workpiece carriers mounting on a series of prestretched equal length, flexible, spirally wound cable links having precisely longitudinally spaced apart, rigid pins fixed to their ends at locations such as to provide a common cable length at a time when the cables are all under a predetermined common tensile load;

d. a drive for driving said conveyor sprockets in increments of revolution punctuated by periods of dwell sufficient for a work operation to be performed at the work stations;



e. mechanism maintaining a predetermined tensile load on said conveyor substantially equal to the load applied to the cables when the pins are fixed thereto;

f. said carriers having longitudinally central, transversely elongate, longitudinally adjacent sockets for receiving the adjacent pins on adjacent cable links; and

g. the adjacent pins on adjacent cable links being connected by rigid roller chain links, and said carriers having transversely spaced grooves for accommodating said roller chain links.

4,881,634

REPOSITIONING APPARATUS FOR ELONGATED GOODS, ESPECIALLY LOADING AND UNLOADING APPARATUS FOR RAILS, STRIPS, OR THE LIKE, ON OR FROM A ROLLER CONVEYOR

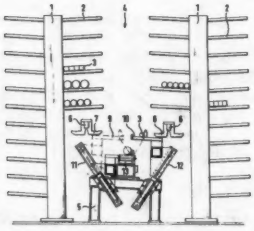
Armin Stolzer, Renchen, Fed. Rep. of Germany, assignor to KEURO Maschinenbau Gesellschaft mit beschrankter Haftung & Co. Kommanditgesellschaft, Achern-Gamshurst, Fed. Rep. of Germany

Filed Sep. 23, 1988, Ser. No. 248,778

Claims priority, application Fed. Rep. of Germany, Oct. 26, 1987, 37361228

Int. Cl.[4] B65G *37/00*

U.S. Cl. 198—372 **14 Claims**



1. Repositioning apparatus for elongated goods, especially loading and unloading apparatus for elongated goods on a roller conveyor (13) having rollers for supporting the goods, comprising

a frame element (5) located adjacent the roller conveyor;

guide track means (11, 12) on said frame element extending in a plane essentially transverse to the roller conveyor in an upwardly inclined direction from below the roller conveyor to above and laterally of the roller conveyor;

a plurality of movable support elements (9, 14, 16; 10, 15, 17) positioned along the roller conveyor and movable in said guide means,

said movable support elements having upper support surfaces positioned in an essentially common plane for, temporarily supporting the goods when transferring the goods to and from the roller conveyor,

said movable support elements being conjointly movable between a lowered position in which the upper support surfaces are below a support plane defined by the rollers of the roller conveyor (13) and a raised position in which the upper support surfaces are above the support plane and positioned laterally of the roller conveyor.

4,881,635

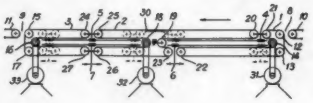
METHOD OF AND ARRANGEMENT, FOR TRANSPORTING PIECE GOODS AND FOR ORGANIZED CHANGING THEIR POSITION

Hans D. Raschke, Hannover, Fed. Rep. of Germany, assignor to H. Bahlsens Keksfabrik KG, Hannover, Fed. Rep. of Germany

Filed Sep. 11, 1987, Ser. No. 96,965

Int. Cl.[4] B65G *47/26*

U.S. Cl. 198—460 **45 Claims**



1. A method of transporting piece goods and organized changing their position, comprising the steps of transporting goods in a plurality of substantially parallel tracks by a transporting device from a supply conveyor to a discharge conveyor spaced from one another in a predetermined direction; determining a position of the goods by sensing means at least in the region between the supply conveyor and the transporting device; supplying the goods to each track of the transporting device with a mean value of arrival and a variance of arrival; providing in each track of the transporting device at least three transporting conveyors, and transitions between two adjacent ones of the transporting conveyors; changing a speed of the transporting conveyors of the transporting device; and moving a respective one of the transitions in said direction to change their position, so that by changing the position of the transition and the speed of the transporting conveyors pieces or groups of goods can change their position separately from other pieces or groups of goods so as to be accelerated or decelerated.

4,881,636

FLOATING SEPARABLE KEY CASE

G. James Oletzke, 24150 E. Cedar Lake Dr., New Prague, Minn. 56071

Filed Dec. 28, 1987, Ser. No. 137,969

Int. Cl.[4] A45C *11/00*

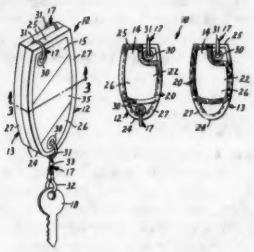
U.S. Cl. 206—37.1 **9 Claims**

1. A floating key case comprising first and second totally separate generally planar wall portions each having a periphery and inner and outer surfaces, said wall portions each comprising a layer of a soft flexible material having a density substantially less than that of water;

key retaining means on each of said wall portions adapted to have a key attached thereto and to afford movement of the key from a position adjacent the inner surface of said wall portion to a position projecting beyond the peripheral edge of said wall portion; and

attaching means for releasably attaching said wall portions together with said inner surfaces adjacent and for defining adjacent portions of said inner surfaces bounded by said attaching means adapted to receive keys attached by said

key retaining means between said adjacent portions of said wall portions, said wall portions being totally separable to



afford use of the keys attached thereto by said key retaining means in separate locations.

4,881,637

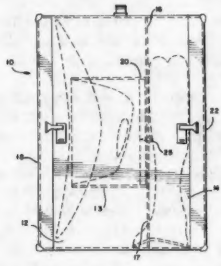
HAT AND BOOT CASE

Jack Peters, 806 Eastwood Dr., and Jack T. Melton, 537 S. Cortez St., both of, Prescott, Ariz. 86303

Filed Mar. 21, 1989, Ser. No. 326,357

Int. Cl.[4] B65D *85/18*

U.S. Cl. 206—278 **11 Claims**



1. Means for carrying both boots and a hat comprising:

an enclosed container having an interior partition dividing said container into separate boot and hat storage compartments;

a pair of generally opposed parallel doors on opposite sides of said interior partition for providing selective access to said boot and hat compartments;

means for mounting said hat in said hat storage compartment,

at least one aperture defined in said partition adjacent its edge for each boot to be stored in said boot compartment, said apertures permitting the widest portion of each boot to extend into said hat compartment.

4,881,638

GOLF BAG WITH DIVIDER AND PUTTER HOUSING

Sung C. Cho, Seoul, Rep. of Korea, assignor to Haldon Industrial Co., Ltd., Seoul, Rep. of Korea

Filed May 27, 1988, Ser. No. 199,378

Claims priority, application Rep. of Korea, Mar. 9, 1988, 3122[U]

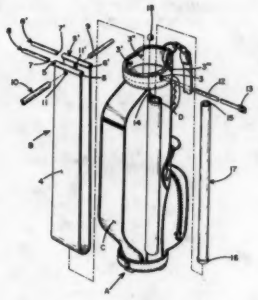
Int. Cl.[4] A63B *55/00*

U.S. Cl. 206—315.3 **3 Claims**

1. A golf bag and insert, comprising in combination:

(a) a golf bag having a body portion defining an elongated interior recess and an upper annular edging about an upper periphery of the body portion, and a first pair of transversely opposed aligned openings through said edging, and a second pair of transversely opposed aligned openings through said edging spaced apart from said first pair;

(b) a flexible insert comprising an elongated strip of material having a width approximately equal to the distance between said aligned openings, said strip having respective ends formed into loops and having a center section suspended into the interior recess of said golf bag defining a U-shaped divider;



(c) a first tube passing through one of said loops and arranged between said first pair of aligned openings, and a second tube passing through the other of said loops and arranged between said second pair of aligned openings; and

(d) a belt passing serially through said aligned openings, said first tube and said second tube, and having fastening means for interlocking said belt in attaching said tubes and said golf bag together, thereby containing said flexible insert in suspension in said interior recess.

4,881,639

IC CARRIER

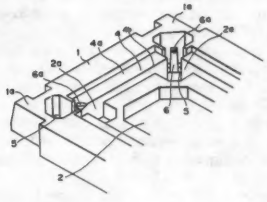
Noriyuki Matsuoka, and Masaaki Kubo, both of Tokyo, Japan, assignors to Yamaichi Electric Mfg. Co., Ltd., Tokyo, Japan

Filed Feb. 22, 1989, Ser. No. 313,604

Claims priority, application Japan, Feb. 26, 1988, 63-43976

Int. Cl.[4] B65D *85/62*

U.S. Cl. 206—328 **2 Claims**



1. An IC carrier comprising a generally rectangular carrier body including a generally rectangular IC accommodating section at a generally central portion thereof, torsion bars each disposed at each corner portion of said carrier body, each torsion bar being disposed on a line opposite each corner portion of said IC accommodating section and diagonally crossing two sides forming the corner portion of said carrier body, resiliently displacable latch arms each rising from each of said torsion bars, and engaging claws each formed on a free end of each of said latch arms and adapted to engage with an upper

edge portion of each of the corner portions of an IC package of a generally rectangular shape accommodated in said IC accommodating section.

4,881,640

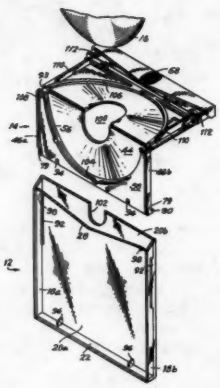
ARTICLE FOR STORING OPTICALLY READABLE AND RECORDABLE DISC DEVICES

Arthur Herr, New York, N.Y.; Toby S. Welles, Norwalk, and Robert W. Johnson, Westport, both of Conn., assignors to Reynard CVC, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 143,897, Jan. 13, 1988, Pat. No. 4,771,883. This application Aug. 26, 1988, Ser. No. 237,581

Int. Cl.[4] B65D 85/57

U.S. Cl. 206—313 15 Claims



1. An insertable drawer member configured and dimensioned for receiving and storing optically readable and recordable disc means within an outer housing in a manner so as to ensure that information hearing areas on said disc means are not damaged during insertion of removal therefrom, said insertable drawer member comprising:

(a) a base portion divided into an upper half and a lower half by a living hinge located therebetween so as to permit downward rotation of said upper half from a first position, coplanar with said lower half, to a second position spaced a distance therefrom, said base portion further having, upon said lower half thereof, a semicircular groove, said groove configured and dimensioned for receiving said optically readable and recordable disc means by pressure-contact with non-information bearing areas of said disc means so as to releasably retain said disc means within said groove;

(b) a lid integrally formed with said upper half of said base portion, said lid configured and dimensioned to include a V-shaped lower edge for contact relation with a corresponding V-shaped upper edge of said outer housing, which V-shaped housing edge ensures insertion and removal of said disc means in a manner which avoids damage to information-bearing areas thereof; and

(c) retaining means for producing a pressure contact between said drawer member and an interior position of said housing, said retaining means comprising

(1) at least one channel member located along a rear surface of said base portion, each said channel member oriented substantially perpendicularly to said living hinge;

(2) a first projecting member extending within each said channel member on said lower half of said base portion, said first projecting member configured and adapted for non-reciprocal slidable passage over a corresponding member located upon an inner surface of said housing; and

(3) a second projecting member corresponding to said first projecting member, said second projecting member extending from an inner surface of a rear wall of said housing at a location opposite and adjacent that of said first projecting member.

5. An insertable drawer member configured and dimensioned receiving and storing optically readable and recordable discs such as compact discs, CD-ROMs, video laserdiscs and the like within an outer housing in a manner which ensures that information bearing areas of said discs are not damaged during insertion or removal therefrom, said insertable drawer member comprising:

(a) a base at least partially defined by a pair of opposed parallel side walls, said base being divided into an upper portion and a lower portion by hinge means located therebetween to permit the downward rotation of said upper portion from a first position coplanar with said lower portion to a second position spaced a distance therefrom, said lower portion comprising an arcuately shaped seat member spaced a distance apart from a flat plate member, said seat member and said plate member forming a front face and a rear face, respectively, of a semicircular groove, wherein said groove is defined by the space therebetween, and further, a portion of said plate member forming a rear face of said groove being at least partially detached from a remaining portion of said plate portion, said semicircular groove additionally comprising at least one member positioned to permit a degree of separation within said groove sufficient to allow retention by pressure contact of at least an uncoded peripheral portion of said disc without scratching or otherwise damaging a remaining coded portion thereof, said lower portion further comprising a relatively narrow, arcuately configured peripheral shelf, located adjacent at least a portion of said semicircular groove, and wherein said upper portion of said base comprises an arcuately shaped raised plateau to support an upper circumferential portion of said disc;

(b) a lid integrally formed with said base, said lid having on at least a portion of a front face thereof a serrated gripping area to facilitate grasping of said lid for movement thereof to permit access to said digital disc, said lid further being configured and dimensioned to include a V-shaped lower edge for contact relation with a corresponding V-shaped edge portion of said housing, which V-shaped housing edge ensures insertion and removal of said disc in a manner which avoids damage to information-bearing areas thereof; and

(c) a parallel pair of vertical channel members located on a rear surface of said base, said channel members oriented substantially perpendicularly to said hinge means, each said channel member being of a sufficient depth, along the upper portion of said base, to form a corresponding raised ridge on a reverse side of said channel member along a front face of said base, each said channel member further comprising a first sloping ramp member projecting substantially perpendicularly from said base in said lower portion thereof, said first ramp member configured for non-reciprocal sliding movement over a correspondingly positioned and configured second ramp member on an inner surface of a rear wall of said housing, and further, each said channel member having a projecting button member located in the upper portion thereof to facilitate snap-locking engagement of said base within said housing.

15. A container configured and dimensioned for receiving and storing optically readable and recordable discs such as compact discs, CD-ROMs, video laserdiscs and the like upon a drawer member adapted for reciprocal back and forth motion within an outer protective housing in a manner which ensures that information bearing areas of said discs are not damaged during insertion or removal from said container, said container comprising:

(a) an outer housing member configured and adapted for insertion and reciprocal back and forth motion of said drawer member therein, said housing having a front face and a rear face, each said face having, along an upper edge portion thereof, a semi-circular groove configured to permit passage

therethrough of at least one finger for subsequent insertion within a corresponding aperture defined by said disc to facilitate removal and insertion of said disc, said front face comprising, adjacent said semicircular groove thereon, a V-shaped edge portion configured to prevent all but an uncoded edge portion of said disc from contacting said housing during insertion and removal therefrom said front face further comprising, on an inner portion thereof on both sides of said semicircular groove, elongated horizontal members each configured in the form of a ¼ cone having a rounded outer edge portion, said ¼ cone members defining between said front face and said drawer member an aperture configured in the form of a shallow elongated funnel to prevent any portion other than an uncoded edge portion of said disc from contacting either said drawer member or said housing when said disc is accessed;

(b) a base at least partially defined by a pair of opposed parallel side walls, said base being divided into an upper portion and a lower portion by hinge means located therebetween to permit the downward rotation of said upper portion from a first position coplanar with said lower portion to a second position spaced a distance therefrom, said lower portion comprising an arcuately shaped seat member spaced a distance apart from a flat plate member, said seat member and said plate member forming a front face and a rear face, respectively, of a semicircular groove, wherein said groove is defined by the space therebetween, said seat member comprising, along a first and a second peripheral edge portion thereof, a free floating projecting member, each said projecting member not attached to an adjacent one of said side walls and projecting upwardly from said seat member at an angle of less than about 45° therefrom to facilitate correct positioning of said disc, and further, a portion of said plate member forming a rear face of said groove being at least partially detached from a remaining portion of said plate portion, said semicircular groove additionally comprising at least one member positioned to permit a degree of separation within said groove sufficient to allow retention by pressure contact of at least an uncoded peripheral portion of said disc without scratching or otherwise damaging a remaining coded portion thereof, said lower portion further comprising a relatively narrow, arcuately configured peripheral shelf, located adjacent at least a portion of said semicircular groove, and wherein said upper portion of said base comprises an arcuately shaped raised plateau to support an upper circumferential portion of said disc and at least one pair of substantially parallel rib members extending perpendicularly from said base, said rib members positioned and configured to operate, in cooperation with a pair of button members extending upwardly from a front face of said arcuate seat member, so as to support a promotional booklet packaged with said disc;

(c) a lid integrally formed with said base, said lid having on at least a portion of a front face thereof a serrated gripping area to facilitate grasping of said lid for movement thereof to permit access to said disc, said lid further being configured and dimensioned to include a V-shaped lower edge for contact relation with said corresponding V-shaped edge portion on said front face of said housing; and

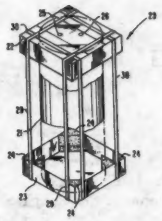
(d) a parallel pair of vertical channel members located on a rear surface of said base, said channel members oriented substantially perpendicularly to said hinge means, each said channel member being of a sufficient depth, along the upper portion of said base, to form a corresponding raised ridge on a reverse side of said channel member along a front face of said base, each said channel member further comprising a first sloping ramp member projecting substantially perpendicularly from said base in said lower portion thereof, said first ramp member configured for non-reciprocal sliding movement over a correspondingly positioned and configured second ramp member on an inner surface of a rear wall of said housing, and further, each said channel member having a projecting button member located in the upper portion thereof to facilitate snap-locking engagement of said base within said housing.

4,881,641

WATER HEATER PACKAGE CONSTRUCTION AND METHOD

Bruce W. Mattingly, Louisville, and Roger J. Coates, Cox's Creek, both of Ky., assignors to Soltech, Inc., Shelbyville, Ky.

Filed Feb. 6, 1989, Ser. No. 307,322
Int. Cl.[4] B65D *85/30*
U.S. Cl. 206—320 **25 Claims**



1. A composite package for appliances and the like comprising:

a top support including a first member having a reinforcing panel and a second member having a reinforcing panel, said reinforcing panels arranged in an overlapping relationship to each other wherein said first member includes in addition to said reinforcing panel, eight other panels, four on each side of said reinforcing panel;

a bottom support including a first member having a reinforcing panel and a second member having a reinforcing panel, said reinforcing panels arranged in an overlapping relationship to each other;

attachment means for attaching said top support to the appliance received within said composite package; and

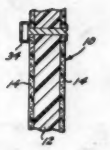
securement means for securing together in a stacked relationship said top and bottom supports with said appliance therebetween.

4,881,642

ELECTROSTATIC CHARGE DISSIPATOR AND METHOD OF MAKING

William D. Adam, 1822 1/2 Newport Blvd., #347, Costa Mesa, Calif. 92627

Filed Dec. 8, 1988, Ser. No. 283,146
Int. Cl.[4] B65D *73/02*
U.S. Cl. 206—328 **9 Claims**



1. Extruded sheet material for draining off an electrostatic charge comprising:

a substrate made of electrically non-conductive resin;

a relatively thin layer fused to at least one of the opposite faces of the substrate, the layer being made of a resin having electro-conductive inclusions dispersed throughout the resin; and

an electrical conductor coupled to the layer for dissipating any electrostatic charge.

4,881,643

CARRIER STRIP

Norbert Pfister, Buchs, Switzerland, assignor to Hilti Aktiengesellschaft, Fürstentum, Liechtenstein

Filed Mar. 2, 1989, Ser. No. 317,855

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1988, 3806624

Int. Cl.[4] B65D *83/00, 85/24, 83/02*

U.S. Cl. 206—343 **8 Claims**

1. Carrier strip for elements to be driven into a receiving material by an explosive powder charge operated setting device, said carrier strip being elongated and having two pair of opposite sides extending in the elongated direction, one said pair of opposite sides comprising a first side and a second side disposed in spaced relation, a second said pair comprising two third sides disposed in spaced relation and extending between said first and second sides, said carrier strip having bores extending between said first and second sides and each said bore having a bore surface with an inside diameter, axially extending nails disposed in spaced relation and displaceably supported in said bores, each said nail has a head at one end and a shank extending axially from the head, at least one guidance member located on each said shank of said nails and extending radially outwardly therefrom into engagement with the bore surface for holding and supporting said nails in said strip, said heads of said nails having an outside diameter not greater than the inside diameter of sid bore surface, wherein the improvement comprises that said head projects axially outwardly from the first side of said strip.

4,881,644

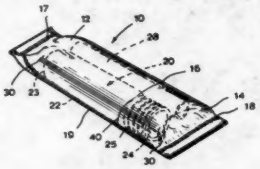
TAMPON APPLICATOR WRAP

Robert C. Norquest, Dover, and Kevin M. Coverdale, Hartley, both of Del., assignors to Playtex Family Products Corporation, Stamford, Conn.

Filed Sep. 16, 1988, Ser. No. 245,832

Int. Cl.[4] B65D *83/10*

U.S. Cl. 206—363 **8 Claims**



1. A tampon package assembly comprising: a tampon applicator having a barrrel member for containing a tampon therein and a plunger member for reciprocal movement within said barrel member to eject the tampon from said barrel member, said barrel member having a fingergrip region at one end and a tampon ejection end at its opposite end; and

a protective wrap having a hollow body for initially containing said tampon applicator therein and having a single score line located at a predetermined position along said wrap to separate said wrap into first and second discrete portions; and

said barrel and plunger members initially sealed in said protective wrap in adjacent side-by-side relationship; and

said second wrap portion including opposed first and second ends, said first end located at said score line and means sealing said second end; and

said score line extending transverse to the sealed applicator members contained therein, overlying the barrel member at its fingergrip region and an end region of the plunger, said score line spaced from the end termini of said barrel fingergrip region and plunger end region in the direction of said second end of the second wrap portion; and

said tampon applicator members remaining in said second portion of the opened wrap with said barrel fingergrip region and plunger end region extending outwardly of the first end of said second wrap portion for grasping by a user for ready removal of said plunger from the wrap while said barrel member remains within said second wrap portion with its tampon ejection end located at, and completely protectively enclosed by, said sealed first end of the second wrap portion, whereby the barrel member may be manually grasped from about said second wrap portion while said plunger member is manually removed therefrom and inserted in said barrel member.

4,881,645

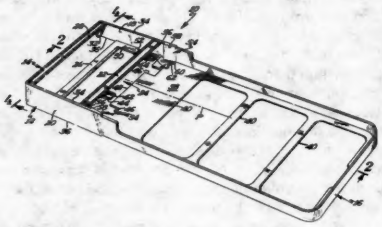
SECURITY CASSETTE HOLDR HAVING INTEGRALLY FORMED RETAINING RAMPS

Mark G. Smiler, Eagan, and John E. Richard, Rockford, both of Minn., assignors to Shamrock Industries, Inc., Minneapolis, Minn.

Filed Jun. 24, 1988, Ser. No. 211,244

Int. Cl.[4] B65D *85/672*

U.S. Cl. 206—387 **21 Claims**



1. A security holder for an article such as a cassette, said security holder comprising:

a frame member having a generally enclosed region and a handle region connected to and extending from the generally enclosed region, said enclosed region defining an opening through which the article may be slidably inserted along a path and engagingly received within the enclosed region; and

retaining means for retaining the article within said enclosed portion of said frame member such that the article cannot be removed from said enclosed portion without destructively altering a portion of said frame member, said retaining means including a pair of opposing retaining ramps integrally molded in a substantially fixed and unbending relation to and along said frame member at least partially obstructing said opening such that the article contacts the retaining ramps and deforms said frame member from an original configuration sufficiently to permit the article to be slidably inserted between said retaining ramps and through said opening with said frame member returning to said original configuration once the article is fully received within said enclosed portion.

4,881,646

ISOTHERMAL PACKAGE MATERIAL

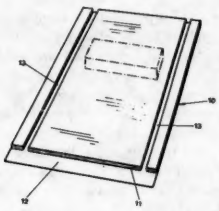
Jean-Pierre Weber, Avenue Gasparin 14, CH-1224 Chene Bougeries, Switzerland

PCT No. PCT/CH82/00103, § 371 Date Apr. 27, 1984, § 102(e) Date Apr. 27, 1984, PCT Pub. No. WO84/00943, PCT Pub. Date Mar. 15, 1984

PCT Filed Aug. 30, 1982, Ser. No. 610,994

Int. Cl.[4] B65D *85/45*

U.S. Cl. 206—460 7 Claims



1. Sheet material for making a sealed isothermal package comprising:

a flexible sheet having a highly reflective outer surface and a self-adhesive inner surface, and

a flexible insulating layer of low heat conductivity material bonded to said flexible sheet by said self-adhesive inner surface,

said insulating layer being of lesser area than said flexible sheet and leaving marginal areas of said self-adhesive inner surface of said flexible sheet exposed for adhesion to an underlying portion of said sheet material when wrapped around an object to be package to seal the package.

4,881,647

PLASTICS CAN

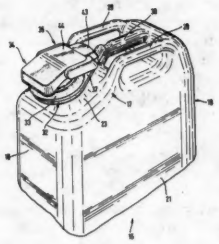
Wolfram Schiemann, Eugen-Nagele-Strasse, 7140 Ludwigsburg, Fed. Rep. of Germany

Filed Nov. 15, 1988, Ser. No. 271,494

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1988, 3814558

Int. Cl.[4] B65D *21/02, 41/06*

U.S. Cl. 206—510 14 Claims



1. Plastic can having a capacity in the region of 10 liters and more, comprising a bottom wall with a standing surface thereon, a top wall opposite to said bottom wall, a front wall, said top wall having a portion inclined towards said front wall, a back wall opposite to said front wall, two lateral walls, a pouring spout on said portion of said top wall inclined towards said front wall, a screw cap adapted to rotate to a closed state for closure of said pouring spout, a device for arresting said screw cap in said closed state in a predetermined rotational position and two bar-shaped handles molded from said upper wall and spaced apart from each other, said handles having upper edges that are tangential to an imaginary plane extending parallel to said standing surface of said bottom wall, said screw cap having an upper face with a first plane surface that in said closed state is the highest raised portion of said screw cap and is tangential to said imaginary plane.

4,881,648

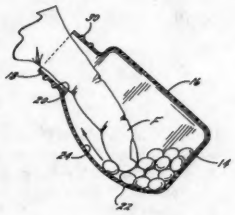
CONTAINER FOR TABLETS, PILLS OR THE LIKE

Robert F. Hagerty, 159 Rutledge Ave., Charleston, S.C. 29403

Filed Sep. 15, 1988, Ser. No. 244,989

Int. Cl.[4] B65D *83/04*

U.S. Cl. 206—540 7 Claims



1. A container adapted for containing a plurality of tablets, pills, or the like, and characterized by the ability to permit the tablets, pills, or the like to be readily and individually grasped by one's finger and slidably removed from the container without requiring a high degree of manual dexterity, and comprising an integral body which includes

a generally horizontal bottom wall having an outer periphery;

a circumferential side wall extending upwardly from said outer periphery of said bottom wall so as to define an enclosure;

a generally cylindrical neck positioned at the upper extremity of said side wall and defining a generally cylindrical opening which is sized to receive one's finger therethrough and so that the finger is able to flex and reach downwardly a substantial distance within said enclosure, said neck being relatively short and having a length of only a small fraction of the length of one's finger so that one's finger may extend beyond the neck within the confines of the container;

means on said neck for receiving a closure member for sealingly closing the container;

a closure member cooperating with said means on said neck for sealingly closing the container, and wherein said closure member is relatively short and has a length of about the same as said neck; and

wherein said side wall includes a bulbous portion extending downwardly from said neck and laterally outwardly from said opening of said neck and being continuously curved to said horizontal bottom wall, and with said bulbous portion and said neck defining a continuous inner wall surface which extends along the length of said bulbous portion and through said neck opening, and with said continuous inner wall surface being smooth along its entire length so as to permit a single tablet, pill, or the like to be grasped and isolated on said inner wall surface in said bulbous portion by one's finger extending through said opening and then slidably withdrawn by one's finger along said inner wall surface and outwardly through said neck opening without engaging any abutment.

4,881,649

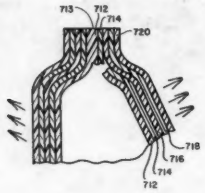
PACKAGE HAVING INSEPARABLE SEALS AND A MODIFIED PLY-SEPARATION OPENING

Joseph C. Hsu, Neenah, and Anthony C. Guckenberger, Appleton, both of Wis., assignors to American National Can Company, Chicago, Ill.

Continuation of Ser. No. 52,299, May 21, 1987, abandoned, which is a continuation of Ser. No. 819,312, Jan. 16, 1986, Pat. No. 4,704,314. This application Apr. 17, 1989, Ser. No. 339,969

Int. Cl.[4] B65D *17/00*

U.S. Cl. 206—634 14 Claims



1. A closed and sealed package made with packaging materials including a multiple layer packaging sheet material having a plurality of layers bonded to each other at respective layer interfaces, defining a thickness of said sheet material, said sheet material including a first seal layer on a first surface thereof disposed on the interior of said package, said first seal layer being bonded to a substrate comprising a second outer surface disposed toward the exterior of said package, said package having been closed by seals forming a closure between surface layers forming a substantial portion of the interior surface of said package, said seals comprising inseparable seals between first and second surface seal layers of corresponding first and second opposing packaging sheet materials at an interface therebetween, whereby said first and second seal layers are so fused together that said interface therebetween ceases to exist as an interface, at least one of said opposing first and second sheet materials comprising said multiple layer sheet material, said inseparable seals being sufficiently strong that no amount of force is effective to separate material comprising said first and second surface seal layers of said opposing packaging sheet materials into their prior configuration with separation preferentially taking place along the original seal interface, said package being adapted to be opened, and thereby to enable gaseous communication between the interior of said package and a surrounding gaseous environment, said opening comprising a combination of tearing through said first seal layer, and thus partially through said thickness of said sheet material, but not to said outer surface, followed by ply separation peeling at one of said interfaces within the interior of said sheet material between two adjoining layers, and wherein the opening of said package to enable gaseous communication between the interior of said package and the surrounding environment is accomplished by propagation of said ply separation peeling outwardly to an edge of said sheet material on the outside of said package.

5. A closed and sealed package made with packaging materials including a multiple layer packaging sheet material having a plurality of unoriented layers bonded to each other at respective layer interfaces, and including a first seal layer on one surface thereof disposed on the interior of said package, said first seal layer being bonded to a substrate comprising a second outer surface disposed toward the exterior of said package, said package having been closed by seals between surface layers forming a substantial portion of the interior surface of said package, said seals comprising inseparable seals such that said package cannot be opened by ply separation of said seals, said package being adapted to be opened, and thereby to enable gaseous communication between the interior of said package and the surrounding environment, said opening comprising a combination of tearing through said first seal layer, and thus partially through the thickness of said sheet material, but not to said outer surface, followed by ply separation peeling at one of said interfaces within the interior of said sheet material between two adjoining layers, and wherein the opening of said package to enable gaseous communication between the interior of said package and the surrounding environment is accomplished by propagation of said ply separation peeling outwardly to an edge of said sheet material on the outside of said package, said multiple layer packaging sheet material having an interface between two of said multiple layers, said interface having a peel strength of 50 to 400 grams per inch width; the required forces being individually less to tear from an inner surface of said package outwardly partially through said sheet material to said interface and to peel apart the layers at said interface, with said peel progressing to an edge of said sheet material, to thereby open said package, than (i) the force required to peel apart said seals between said packaging surface layers or (ii) the force required to tear from an inner surface of said package partially through said sheet material to said interface, peel along said interface to a point between said corresponding seal and an edge of said sheet material, and tear back through said sheet material to a surface outside the seal area of said package and corresponding to continuation of said inner surface.

4,881,650

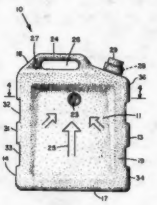
FLUID COLLECTION CONTAINER

Richard O. Bartz, 7017 Mark Terrace Dr., Edina, Minn. 55435

Filed Jun. 14, 1988, Ser. No. 206,313

Int. Cl.[4] B65D *85/00*

U.S. Cl. 220—1 C 22 Claims



1. An apparatus for collecting liquid draining from a motor vehicle and storing the same comprising: a container having an internal chamber for storing liquid, first and second side walls, a bottom wall for supporting the container in a prone position to collect liquid draining from a motor vehicle, said side walls and bottom wall having a plurality of transverse ribs separated by the transverse grooves, a first end wall normally disposed relative to the bottom wall for supporting the container in an upright position to store liquid in said chamber, a second end wall opposite the first end wall, and a top wall joined to the side walls and end walls, said walls surrounding said chamber, said top wall having an upright continuous outer peripheral ridge and a funnel-shaped portion surrounded by said ridge, said funnel-shaped portion having an inwardly and downwardly sloping wall with a lower most portion thereof located in close relationship with respect to the second end wall, said lower most portion having an opening in communication with said chamber whereby liquid drained onto the funnel-shaped portion flows through said opening into the chamber, a spout secured to the second end wall, said spout having a second opening open to the chamber, said spout being located adjacent said first side wall, removable cap means mounted on the spout for closing the second opening, a first handle secured to said second end wall whereby the container can be transported in the upright position, and a second handle secured to the top and bottom walls adjacent the bottom of the second side wall and first end wall, said second handle being spaced from the

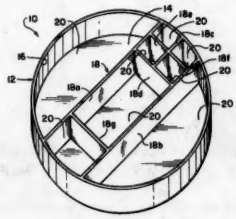
second side wall and the first end wall to provide a recess in said second side wall and first end wall under the second handle, said recess being open adjacent to the second side wall and open adjacent to the first end wall to accommodate a person's hand for firmly gripping said second handle, said first and second handles adapted to be gripped by both hands of a person to facilitate pouring of liquid from the chamber out through the spout.

4,881,651

ROTATABLE ORGANIZER WITH INTEGRAL PIVOT NUB AND PERIPHERAL REDUCED AREA CONTACT NUBS

Nancy Mimoun, and Benson Zinbarg, both of Stamford, Conn., assignors to Sun Hill Industries, Inc., Stamford, Conn.

Filed Aug. 12, 1988, Ser. No. 232,326
Int. Cl.[4] B65D *25/24*
U.S. Cl. 220—18 **14 Claims**



1. A rotatable organizer comprising:

a container having a bottom adapted to rest on a support surface;

main pivot nub means fixed to said bottom and consisting of a non-rotatable element projecting downwardly from said bottom for rotatably supporting said container on said support surface such that said container is spaced from said support surface at least in the vicinity of said main pivot means; and

a plurality of spaced apart, off-center reduced area contact means fixed to said bottom and consisting of a plurality of non-rotatable elements projecting downwardly from said bottom, and arranged in surrounding relation to said main pivot nub means, for raising said bottom off of said support surface during rotation of said container and for reducing the area of contact of the rotatable organizer with said support surface during rotation thereof.

4,881,652

DEVICE SUITABLE FOR USE AS A DUAL-CHAMBERED CAN

Wolfram Schlemann, Eugen-Nagele Strasse 17, 7140 Ludwigsburg, Fed. Rep. of Germany

Filed Oct. 3, 1988, Ser. No. 252,528
Int. Cl.[4] B65D *8/04*
U.S. Cl. 220—20 **6 Claims**

1. Device suitable for use as a one-piece dual-chambered can of blow-molding synthetic material

said device having a larger chamber for holding gasoline, a smaller chamber for holding oil, a separation plane between said chambers, a thin connecting member arranged between said chambers in said separation plane and forming part of said chambers, an upper side on said larger chamber and a handle straddling said separation plane, said handle having a handle root that begins on said upper side of said larger chamber, wherein:

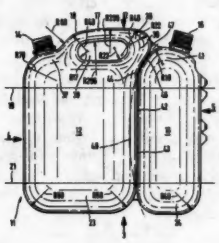
(a) said connecting member is arranged outside of said handle,

(b) said smaller chamber has an upper zone that extends cupola-like at least partway up the height of said handle,

(c) said handle has a second handle root having a bulge that extends very close to said upper cupola-like zone of said smaller chamber,

(d) said second handle root emerges from said upper side of said larger chamber adjacent said upper cupola-like zone of said smaller chamber,

(e) said device has a floor zone on both of said chambers, and viewed from the side, said connecting member describes a



curve from said floor zone to a zone situated between said second handle root and said upper cupola-like zone of said smaller chamber,

(f) said curve comprises a first longer section that extends upward from said floor zone and a second shorter section that rises at a bend between said first and second sections to form an obtuse angle with said first section, and

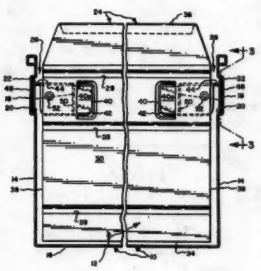
(g) said second handle root is considerably thicker in the zone of said second section than said first handle root, and said second handle root protrudes in the manner of a chin over said smaller chamber and then curves inwardly.

4,881,653

COMPRESSOR

Allen R. Norton, Great Valley, N.Y., assignor to American Locker Group Incorporated, Jamestown, N.Y.

Filed Jul. 11, 1988, Ser. No. 217,437
Int. Cl.[4] A47B *63/00, 88/00*
U.S. Cl. 220—22.3 **13 Claims**



1. A filing device comprising a drawer for receiving contents to be filed, said drawer having a pair of guide channels defining essentially parallel upper and lower channel guide surfaces arranged to extend lengthwise of said drawer and normally being spaced apart through a first distance; and a compressor, said compressor having a compressor plate and a pair of guide means fixed to said compressor plate and arranged in association one with each of said guide channels to support said compressor plate to extend transversely of said drawer between said guide channels and for movement length-

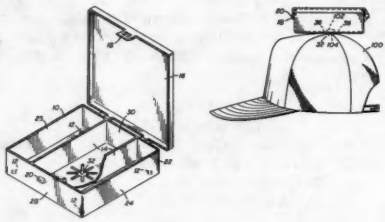
wise within said drawer, each said guide means having essentially parallel upper and lower guide surfaces arranged in facing relation with said upper and lower channel guide surfaces, respectively, with which said guide means is associated and having a spacing therebetween less than said first distance, an upper tooth, a lower tooth spaced from said upper tooth through a distance exceeding said first distance, and abutment means, at least one of said guide channels and said guide means being formed at least in part of resiliently deformable material to permit the upper teeth of said guide means to pass through an over center position relative to the lower teeth of said guide means as an incident to manually effected pivotal movement of said compressor relative to said drawer about a pivot axis defined by engagement of the lower teeth with said lower channel guide surfaces, from a first position defined by surface engagement of said lower guide surfaces with said lower channel guide surfaces into a further position defined by surface engagement of said abutment means with said upper channel guide surfaces, said compressor when in said first position being supported by said guide channels for sliding movement lengthwise of said drawer and when in said further position being constrained by said guide channels against movement lengthwise of said drawer.

4,881,654

CONTAINER FOR MOUNTING ON HEADGEAR

Jack Stazo, 10606 N. Evers, Houston, Tex. 77024, and Joseph W. Whitmer, 13106 Loguna, Houston, Tex. 77015

Filed Jan. 12, 1989, Ser. No. 295,995
Int. Cl.[4] B65D *23/08*
U.S. Cl. 220—85 H **18 Claims**



1. A container for mounting on headgear having four sides, a bottom and a top closure means, said bottom having an opening therein formed by the intersection of at least two cuts to form a plurality of tines, said opening being deformable to allow penetration of a button from said headgear, said button being of smaller diameter than the circumference of the terminal end of the shortest cut.

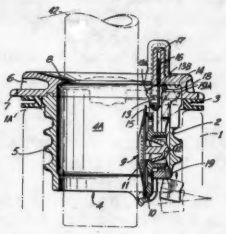
4,881,655

SELF-CLOSING FUEL TANK SEAL

Jaroslav Jansky, Rosenheim, and Angelika Temmesfeld, Raubling, both of Fed. Rep. of Germany, assignors to Temtec Fahrzeugtechnik Entwicklungsgesellschaft mbH, Raublin, Fed. Rep. of Germany

Filed Jul. 21, 1988, Ser. No. 222,409
Int. Cl.[4] B65D *51/16*
U.S. Cl. 220—209 **14 Claims**

1. Self-closing fuel tank closing device mountable on a fuel tank filler pipe and comprising a filler cap which is tensioned in the direction of a sealing seat, is rotatable in the direction of an interior of a spout of the fuel tank roller pipe and is carried by a swivel arm supported at a free end thereof on a supporting surface running approximately perpendicular to a longitudinal axis of the fuel tank closing device, and a clamping device which tensions the filler cap in the direction of the sealing seat and is mounted on the swivel arm in the region between said free end and said filler cap, said free end of the swivel arm



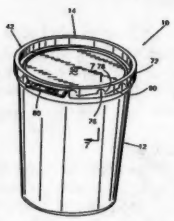
being constructed as a cam guide which glides over the supporting surface as said filler cap is tilted.

4,881,656

TAMPER EVIDENT CONTAINER LID AND METHOD OF MAKING THE SAME

Dexter W. Chumley, Fremont, Ohio, and Fredrick O. Miller, Saginaw, Mich., assignors to Sandusky Plastics, Inc., Sandusky, Ohio

Filed Oct. 24, 1988, Ser. No. 261,508
Int. Cl.[4] B65D *17/40, 41/48*
U.S. Cl. 220—270 **19 Claims**



1. A package comprising:

(a) a container having an open end defined by end structure forming a sealing portion and a rim surrounding the open end; and

(b) a tamper evident lid closing the container end, the lid comprising:

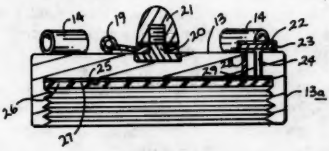
(i) seal structure in sealing engagement with the container sealing portion;

(ii) a skirt disposed about said end structure and extending from said rim along said container in a direction away from the open end, said skirt defining a first skirt portion adjacent said rim and a second tear strip portion extending from said first skirt portion, said skirt portions connected by a plurality of narrow necks extending between skirt perforations, and latching projections formed in said tear strip portion adjacent said first skirt portion, said projections extending inwardly from said skirt and projecting in a direction toward said end opening, said projections extending into latching relationship with said container rim with said projections engaging the container rim and tearing the necks to strip off the tear strip when the lid is removed from the container.

4,881,657
MILITARY GAS CAN VENT CAP

Gary L. Capasso, 6121 Collins Rd., #251, Jacksonville, Fla. 32244

Filed Aug. 10, 1988, Ser. No. 230,524
Int. Cl.[4] B65D *51/16*
U.S. Cl. 220—303 3 Claims



1. A vent cap apparatus for use in combination with a container, and container formed with an internally threaded opening, said apparatus comprising,

an adapter means for threadedly interfitting with said internally threaded opening at a lower end of said adapter and accepting an internally threaded cap at an upper end of said adapter, and

said cap including an exterior upper surface with a vent tube integrally secured thereto for permitting passage of vapor from within said container and prevent liquid intrusion from entering said container, and

a vent conduit operatively connected from a first cavity interiorly of said vent tube to a second cavity defined between an annular gasket positioned interiorly of said cap and an upper interior surface of said cap, and

wherein said adapter means comprises an externally threaded annular conduit wherein said lower end is of a first diameter and said upper end is of a second diameter and said upper end is of a diameter greater than said first diameter, and said adapter is formed with an upper terminal planar surface means for engagement with an outer perimeter of said gasket and

wherein said vent conduit includes a porous non-corrosive material secured therein for enabling passage of vapors and preventing passage of liquid therethrough, and

wherein said gasket includes a stem positioned within a bore adjacent said vent conduit for maintaining said gasket at a desired orientation relative to said upper interior surface to define said second cavity.

4,881,658
SEALED CONTAINER

James M. VanCucha, Strongsville, Ohio, assignor to Cleveland Container Corporation, Cleveland, Ohio

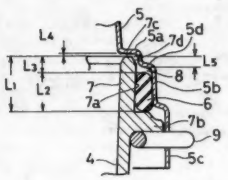
Filed Aug. 17, 1988, Ser. No. 233,071
Int. Cl.[4] B65D *43/06, 43/10*
U.S. Cl. 220—306 5 Claims

1. A container assembly comprising a container having a sidewall and open at one end and closed at the other end by a bottom wall, and a lid for closing the open end of said container either with or without the use of sealing material, said sidewall having a lip extending along the open end thereof, said lip comprising an upper horizontally protruding arm and a lower downwardly extending protruding leg spaced beneath said upper arm, said lid including a radially inner vertical leg and a radially outer vertical leg extending substantially parallel to said sidewall of said container and a bridge extending substantially perpendicular to the sidewall and connecting said inner and outer legs, said inner and outer legs and said bridge cooperatively forming a downwardly extending circumferential channel into which said lip of said container is received, said outer leg including a single protruding hook which is capable of engaging said upper arm of said lip at a first position relative to said sidewall so as to facilitate the use of such sealing material between said lid and said container and which is capable of engaging said lower leg of said lip at a second position relative to said sidewall when such sealing material is not utilized between said lid and said container.

4,881,659
GOVERNOR CAP SEALING STRUCTURE OF TRANSMISSION GEARBOX

Hirao Uchiyama, Yokohama, and Hiromi Taguchi, Zama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jul. 19, 1988, Ser. No. 221,359
Claims priority, application Japan, Jul. 23, 1987, 62-111855[U]
Int. Cl.[4] B65D *45/32*
U.S. Cl. 220—319 3 Claims



1. A governor cap sealing structure of a transmission gearbox, comprising:

a governor cap for covering a governor valve arranged outside the transmission gearbox;

a mount member having a sealing surface, attached to the outside of the transmission gear box; and

a sealing member arranged between the governor cap and the sealing surface of the mount member when the governor cap is mounted to the mount member, a width of the sealing surface of the mount member being larger than that of the sealing member, wherein

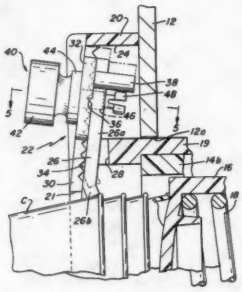
the governor cap includes a sealing portion and first and second shoulder portions arranged approximately perpendicular to the sealing portion, the second shoulder portion being positioned closer to the sealing portion than the first shoulder portion,

the mount member includes one end surface positioned approximately perpendicular to the sealing surface, the one end surface defining one end of the sealing surface, and

when the governor cap is mounted to the mount member, the sealing portion of he governor cap is positioned opposite to and approximately parallel to the sealing surface of the mount member, and the one end surface of the mount member is positioned opposite to and approximately paral-

lel to the first shoulder portion of the governor cap with a small gap therebetween.

4,881,660
JUMBO CUP DISPENSER
J. Marshall Suttles, Elberton, Ga., assignor to Royston Corporation, Royston, Ga.
Filed May 3, 1988, Ser. No. 189,847
Int. Cl.[4] A47F *1/04*
U.S. Cl. 221—44 **12 Claims**



1. A dispenser for paper cups and the like comprising, in combination:

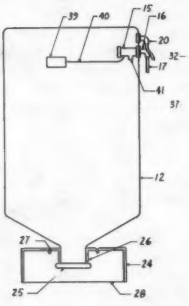
tube means formed to fit in a panel cutout and to receive a nested stack of the cups for discharging from one end thereof, said tube means having a continuous unobstructed interior surface;

flange means fixed to said one end having a central opening coaxial with said tube means for flush mounting around the panel cutout, said flange means including radial slots communicating with the central opening and closed on the outside periphery thereof;

tabs radially slidable in respective ones of said slots from a position completely withdrawn from the central opening to an extended position within said opening for frictionally engaging the rim of the cups; and

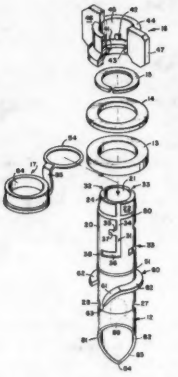
fasteners coupled to said tabs and said flange means for locking said tabs in either one of said positions.

4,881,661
WATER BOTTLE REFILL SYSTEM
Josh B. Jones, 3920 Delery Dr., Marrero, La. 70072
Filed Apr. 1, 1988, Ser. No. 177,424
Int. Cl.[4] G01F *23/10*
U.S. Cl. 222—67 **4 Claims**



1. An inverted water bottle dispenser means, said dispenser means having a main frame stand provided with at least one spigot operably connected to an inverted water bottle, said water bottle positioned on said main frame stand by converting the dispenser means from a single batch water source to a continuous source, a water tight convoluted flexible sealing means between a neck of the inverted water bottle and the main frame stand, the water bottle being provided with vent means and operably connected to water flow control means adapted for connection to a continuous source of purified water to be supplied to the bottle wherein said water tight convoluted flexible sealing means comprises a circular member having an inner neck portion adapted for being positively sealed to the neck of the inverted water bottle, and an outer bottom portion adapted for being positively sealed to the main frame stand, the member being further defined as comprising a flexible bellows portion operably connecting said inner neck portion to said outer bottom portion.

4,881,662
DISPENSING SPOUT
Gary C. Tallman, P.O. Box 4, Whitefish, Mont. 59937
Filed May 27, 1988, Ser. No. 199,830
Int. Cl.[4] B67B *7/24*
U.S. Cl. 222—81 **29 Claims**



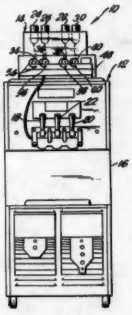
1. A dispensing spout comprising a generally tubular body defining a passage therethrough between axially opposite end portions of said tubular body, means at one axial end portion of said tubular body for penetrating a wall of a container within which is packaged a dispensable product, said tubular body including thread means for connecting said tubular body to said wall upon rotation of said tubular body, a ring surrounding said tubular body in free axial reciprocal sliding relationship thereto, and said ring including first means in external free axially reciprocal sliding relationship and rotating relationship to said tubular body and cooperative with second means upon said tubular body for initially imparting rotation to said tubular body thereby threading said thread means to an associated container wall followed by a relative axial movement between said tubular body and said first means and thereafter a relative rotational movement between said tubular body and said first means to clampingly connect said tubular body to an associated container wall.

4,881,663

VARIEGATED SOFT ICE CREAM DISPENSING APPARATUS

William B. Seymour, 22-17 72nd St., Jackson Heights, N.Y. 11370

Filed Jun. 20, 1988, Ser. No. 209,020
Int. Cl.[4] B67D 5/60
U.S. Cl. 222—132 **7 Claims**



1. A syrup dispensing apparatus for mounting to a soft ice cream freezer apparatus for producing a variegated ice cream product of the type having one or more syrup flavors combined in an ice cream with a marble-like appearance, said soft ice cream freezer apparatus comprising a dispensing nozzle and actuator means for selectively starting and stopping a flow of soft ice cream through the dispensing nozzle, said syrup dispensing apparatus comprising:

a plurality of syrup reservoirs for storing respective ones of a plurality of different flavors of syrup therein;

a multi-channel pump in communication with each of said plurality of syrup reservoirs and operative to selectively pump syrup from selected ones of said syrup reservoirs; and

a syrup nozzle head mountable to the dispensing nozzle of the soft ice cream freezer, said syrup nozzle head comprising a mounting collar having means for fixedly engaging the dispensing nozzle of the soft ice cream freezer, an annular inlet collar having a through aperture through which soft ice cream from the dispensing nozzle of the soft ice cream freezer is flowable, said annular inlet collar further having a plurality of nipples spaced circumferentially around and extending generally radially into the through aperture, said nipples being in communication with said multi-channel pump such that said pump is operative to direct selected flavors of syrup from said reservoirs into said nipples at a plurality of locations circumferentially around and into a flow of soft ice cream directed through the through aperture of said syrup nozzle head for creating a variegated soft ice cream product, whereby the type of variegated soft ice cream produced can be changed by selecting the reservoirs from which the multi-channel pump will pump the syrup.

4,881,664

DISPOSABLE VALVE WITH DISK-LIKE VALVE ELEMENT

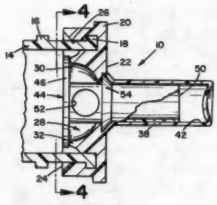
Raymond P. Kawolics, Solon, Ohio, assignor to The Meyer Company, Cleveland, Ohio

Filed Sep. 13, 1988, Ser. No. 243,695
Int. Cl.[4] B67D 5/32
U.S. Cl. 222—153 **5 Claims**

1. A dispensing valve particularly suited for use on the outlet nozzle of a membrane type beverage container comprising:

a first unitary component formed from a resilient resinous material and having a generally cylindrical main body with opposed axial ends, one of said axial ends including an axially open circumferential groove adapted to sealingly receive and be retained on the outer end of said outlet nozzle, a circumferentially continuous seat lying radially inwardly of said groove and extending axially outward, an opening extending axially through said body from said one axial end to the other axial end, said opening having an enlarged end portion in said one axial end, and a cylindrical closed end tubular portion extending outwardly from said other axial end joined to said body about said opening;

an integral valve element and dispensing tube component comprising an imperforate disk having opposed faces and



a diameter at least greater than the maximum diametric extent of said seat, a hollow dispensing tube joined centrally to one face of said disk and extending axially thereof, said tube having an inlet port formed in the wall thereof at a location adjacent said disk and an outlet port adjacent the end of said tube remote from said disk, a radially extending flange carried on said tube at a location intermediate said inlet and outlet ports; and,

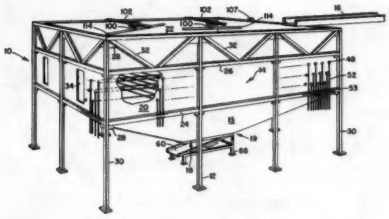
said valve element and dispensing valve component assembled in said main body with the tubular portion of said main body enclosing said tube and said outlet port, said radially extending flange being engaged by said body and biased thereby in a direction to cause said disk to sealingly engage said seat.

4,881,665

SUSPENDED FLEXIBLE MEMBRANE STORAGE SILO AND ARTICLE DISPENSER

Michael L. McGuire, 1102 Wild Orchid Dr., Fallston, Md. 21047

Filed Mar. 22, 1988, Ser. No. 171,785
Int. Cl.[4] B67D 5/06
U.S. Cl. 222—181 **24 Claims**



1. A bulk storage silo for damageable articles, comprising:

a rigid frame of a desired configuration and dimensions including vertical members having a top and a bottom and horizontal members extending between and interconnecting said vertical members, said horizontal members defining upper horizontal supports and medial horizontal supports, said upper supports being located proximate to the

top of said vertical members and extending around the upper periphery thereof and said medial supports extending around the periphery between the upper supports and the bottom of said vertical members,

a flexible member for attachment to and suspension within said frame fashioned from at least one sheet-like membrane, said flexible member being composed of a tear-resistant reinforced grid of interconnected strands embedded in a synthetic resin, said flexible member defining side walls extending between said upper supports and said medial supports and an inverted frustum configured bottom converging within the frame between said medial supports and the bottom of said vertical members at a fixed elevation above the bottom, said flexible member operative to contain articles in anon-damaging manner,

connecting means for connecting said flexible member to both said upper and medial supports,

a discharge duct located at the frustum of said flexible member, and

vibrating means isolated from said rigid frame and vibrationally associated with said discharge duct for inducing vibration of a selected amplitude and frequency and imparting the vibration to the articles contained in said flexible member proximate to said discharge duct in a manner that the articles discharge substantially uniformly from said discharge duct without imparting undue vibration to said rigid frame,

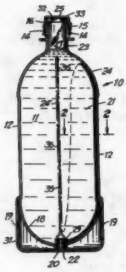
where articles are stored in and discharged from the silo in a manner to preserve the integrity of the articles after being introduced over top of said frame and into the space defined by the flexible member urged through the discharge duct by said vibratory means.

4,881,666

VARIABLE VOLUME CONTAINER

Robert Tullman, and Stephen Tullman, both of 83 Knollwood Dr., Cherry Hill, N.J. 08002

Filed Jan. 19, 1988, Ser. No. 145,588
Int. Cl.[4] B65D *23/00*
U.S. Cl. 222—386.5 **14 Claims**



1. A liquid dispenser which comprises:

a rigid container defining a volume for said liquid, said container having a pouring orifice and an aperture;

a flexible, gas impermeable follower disposed in said container for defining a variable volume, said follower having an opening at one end; and

a valve secured in said aperture in said container with said open end of said follower secured about said valve for providing communication between ambient atmosphere and said variable volume when said valve is open,

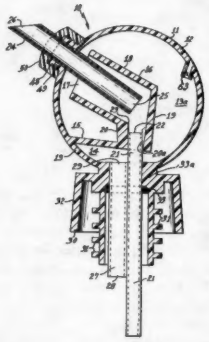
said valve moving to said open position when a pressure differential is established between ambient atmosphere and said container volume as liquid is dispensed through said orifice, whereupon ambient gas enters and expands said follower solely by virtue of said pressure differential, said valve moving to a closed position when liquid dispensing ceases and said pressure differential diminishes for substantially retaining said gas in said follower, whereby said gas filled follower substantially fills the container volume vacated by dispensed liquid, thereby minimizng the headspace in said container even after the contents thereof are partially dispensed.

4,881,667

SIPHON DISPENSER

Mike Perakis, 1704 N. Atlantic Ave., Daytona, Fla. 32018

Filed Jul. 6, 1987, Ser. No. 69,760
Int. Cl.[4] G01F *11/28*
U.S. Cl. 222—437 **12 Claims**



1. In a siphon dispenser device for dispensing liquid from a container in predetermined amounts having a hollow body, said body having an interior partial partition to form a liquid receiving chamber and a measuring chamber communicating with each other, a tubular and vertically disposed lower neck portion communicating between said receiving chamber and an aperture of a fluid container holding liquid to be dispensed, an upper elongated tubular pouring spout having an inner end communicating with said measuring chamber, said body having an air vent communicating between the hollow of said body and exteriorly thereof, tubular siphon means located within said body about said inner end of said pouring spout to periodically siphon a predetermined amount of liquid into a serving container, said tubular neck portion including an elongated air tube having a lower end portion, said tubular neck portion further including a tubular fluid conduit communicating with said liquid receiving chamber, the improvement comprising aperture restriction means being located adjacent said lower end portion of said air tube and having a ball sized to be freely movable vertically therein, upper and lower stop means in said lower end portion of said air tube for restricting the movement of said ball therein, a lateral aperture located in said tube spaced above said upper stop means.

4,881,668

CLOSURE WITH OPEN LID RETAINER

Lawrence R. Kitterman, Antioch, and Robert D. Rohr, Elgin, both of Ill., assignors to Seaquist Closures, A division of Pittway Corporation, Crystal Lake, Ill.

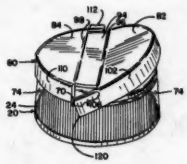
Filed Jun. 8, 1988, Ser. No. 204,109
Int. Cl.[4] B65D *47/00*
U.S. Cl. 222—482 **24 Claims**

1. A closure for use on a container defining an opening communicating with the container interior, said closure comprising:

a body for being mounted to said container over said container opening and defining at least a first aperture for communicating through said container opening with the container interior, said body having a peripheral side wall outwardly of said first aperture, said body including a transverse top wall defining at least said first aperture;

a cover mounted to said body over said body top wall and defining at least a first lid;

at least a first hinge means for connecting said first lid directly to another part of said cover for accommodating the pivoting of said first lid between a closed position occluding said



first aperture and an open position spaced away from said first aperture;

said first lid including a first arm at one end of said first hinge means projecting away from the rest of said first lid beyond said first hinge means;

at least one of said first arm and said side wall being resilient; and

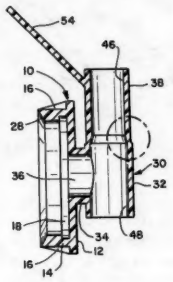
said first arm being configured to engage said body side wall when said first lid is in said open position whereby said first lid is held in said open position by frictional engagement between said first arm and said side wall.

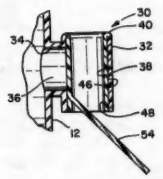
4,881,669

DISPENSER VALVE AND METHOD OF FORMING THE SAME

James P. Leigh, and Henry G. Roethel, both of Ravenna, Ohio, assignors to The Meyer Company, Cleveland, Ohio

Filed Jun. 16, 1988, Ser. No. 207,742
Int. Cl.[4] B67D *3/00*
U.S. Cl. 222—505 **21 Claims**





1. A dispensing closure assembly comprising:

a one piece tube member comprising a first tube section with a circumferentially continuous side wall and

a second tube section joined with said first tube section by a relatively thinner and flexible intermediate section molded integrally with said first and second tube sections and forming a continuation thereof, said second tube section having a relatively resilient, circumferentially continuous side wall;

a fluid passage opening formed through said side wall of said first tube section;

said second tube section being inverted relative to said first tube section at said intermediate section to place the continuous side wall of said second tube section in sealing engagement with the side wall of said first tube section and overlying said fluid passage; and,

means for selectively deflecting said second tube section away from said first tube section to permit flow through said fluid passage opening.

10. A method of forming a dispensing valve comprising:

(a) providing a tubular body having a first circumferentially continuous side wall portion and a second relatively resilient circumferentially continuous side wall portion which extends from and forms an integral continuation of said first wall portion;

(b) forming a flow passage port through said first side wall portion; and,

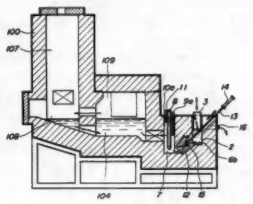
(c) invaginating said second relatively resilient side wall portion into said first portion to sealingly overlie said flow passage port.

4,881,670

AUTOMATIC MELT SUPPLYING METHOD AND HOLDING FURNACE HAVING AUTOMATIC MELT SUPPLYING SYSTEM

Masao Yamaoka, and Tomohiro Toyota, both of Yao, Japan, assignors to Kabushiki Kaisha Daiki Aluminium Kogyosho, Osaka, Japan

Filed Sep. 13, 1988, Ser. No. 246,570
Claims priority, application Japan, Jul. 1, 1988, 63-164257
Int. Cl.[4] C21C *5/42*
U.S. Cl. 222—590 **14 Claims**



1. A method for automatically supplying a melt to a casting device, comprising;

supplying a melt to a holding chamber for holding said melt at a predetermined temperature,

supplying said melt in said holding chamber to a melt supply chamber via an opening between said holding chamber and said supply chamber,

controlling a stopper plug for opening and closing said opening to control a melt flow from said holding chamber to said supply chamber, and

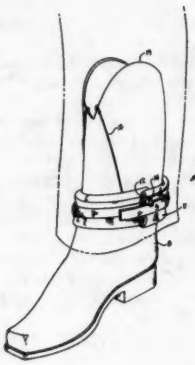
lowering a vertically movable force block into said supply chamber to displace and force a predetermined amount of melt from said supply chamber to said casting device.

4,881,671

SELF-DUSTING INSECTICIDE BOOT ATTACHMENT

Robert D. Horton, Rte. 3, Box 3456, Athens, Tex. 75751, and Doyle J. Farley, R.R. #1, Box 8-2, Murchison, Tex. 75778

Filed Apr. 25, 1988, Ser. No. 185,883
Int. Cl.[4] A45C *13/30*
U.S. Cl. 224—222 3 Claims



1. A self-dusting boot apparatus for the distribution of insect repelling powder about a boot for use in combination with said boot wherein said boot comprises a lower surface and an integral upper vertical surface terminating in an upper vertical edge, said apparatus comprising,

a pouch means for selective attachment about the upper vertical surface of said boot and said pouch means including a selective opening means for filling said pouch means with the insect repelling powder, and

strap means including fastening elements integrally secured to an exterior surface of said pouch means for encircling securement of said pouch means to said boot about said upper vertical surface, and

wherein said fastening elements include hook and loop fasteners with respective hook and loop fasteners at opposed terminal ends of said strap means, and

wherein said strap means is secured to said pouch means immediately below said selective opening means, and

wherein said selective opening means includes a zipper positioned between opposed coextensive terminal ends of said pouch means to an interior surface of said pouch means, and

wherein said pouch means is of a linear dimension equal to or greater than a permieter surface about said upper vertical surface of the boot, and

wherein a plurality of elongate boot hooks are secured to a rear surface of said pouch means at lower ends of the hook on an opposite side of said pouch means to that having secured thereto said zipper and said strap means to enable securement of the hooks to the upper edge of the boot wherein each of the hooks further includes a "U" shaped upper end for overlying securement to the upper edge of the boot to enable said pouch means to be positioned and arranged for attachment to the upper edge of said boot.

4,881,672

SAFETY ATTACHMENT PRUSE HOOK

Olivia Gustafson, 514 A St., Fairbanks, Ak. 99701

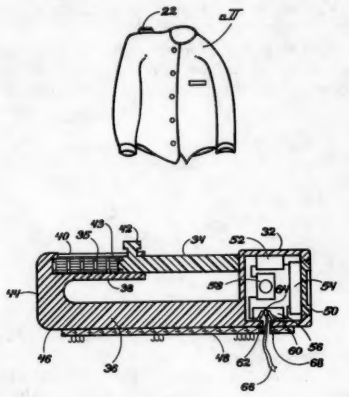
Filed May 3, 1988, Ser. No. 189,950
Int. Cl.[4] A41F *15/02*
U.S. Cl. 224—264 5 Claims

1. A safety attachment purse hook for securing a purse strap to an article of apparel, comprising:

hook means for engagement with a purse strap;

cooperating hook and loop type fastening strips on said hook means and on said article of apparel for releasably securing said hook means to said article of apparel;

alarm means on said hook means for providing a signal upon attempted theft of a purse carried thereon; and



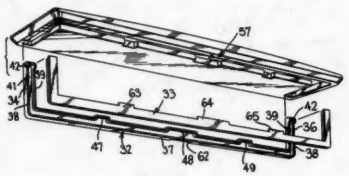
means for actuating said alarm means upon disengagement of said cooperating hook and loop type fastening strips on said hook means and said article of apparel.

4,881,673

RETRACTIBLE SUPPORT BAR

Gregory W. Kapp, Coloma, Mich., assignor to Innocorp Manufacturing, Inc., Coloma, Mich.

Filed Apr. 21, 1988, Ser. No. 184,355
Int. Cl.[4] B60R *7/08*
U.S. Cl. 224—311 8 Claims



1. A retractible support-bar assembly for supporting various kinds of objects in a vehicle, comprising:

means defining a base having an outwardly facing surface, said base means having a generally U-shaped, outwardly opening, recess in said outwardly facing surface;

a generally U-shaped bar having a pair of spaced legs which lie in a common plane with a bight portion of said bar, said U-shaped bar being conformed in size to be received in said U-shaped recess in said base means and conformed in thickness so as to provide a surface thereon which is flush with said outwardly facing surface of said base means when said bar is received in said U-shaped recess;

pivot means for pivotally securing said bar to said base means so that said bar is movable into and out of said recess, said pivot means including protuberances projecting into said recess and being located adjacent the free ends of said legs of said U-shaped bar, said plane of said bar being, when said bar extends out of said recess, inclined to said outwardly facing surface at a defined angle;

said bar including first and second parts, said first part being

generally U-shaped in cross section throughout its length with legs of the U adjacent said free ends having openings therein adapted to receive therein said protuberances, said legs of said first part being resiliently yieldable to allow at least said free ends of said legs to move past said protuberances to facilitate introduction of said protuberances into said openings, said second part being conformed in its shape to said first part to facilitate it being operatively secured to an open side of said first part defined by an open end of said U-shaped cross section to render said resiliently yieldable legs of said first part rigid so as to prevent removal of said protuberances from said openings; and

releasable latch means for holding said bar in said recess;

whereby a release of said latch means will enable said bar to pivot out of said recess to expose and thereby render accessible said bight portion of said bar to enable various of said objects to be supported therefrom.

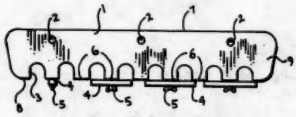
4,881,674

FISHING ROD HOLDER

Anatoly Medianik, 46 Tone Ter., Rochester, N.Y. 14617

Filed May 3, 1988, Ser. No. 189,949

Int. Cl.[4] B60R *7/00*

U.S. Cl. 224—311 **1 Claim**

1. A fishing rod holder for holding a plurality of fishing rods adjacent an interior ceiling of a pickup truck cap having a plurality of spaced transverse cross braces, comprising:

an elongated first support member;

a plurality of spaced apertures formed through said first support member;

first clamping means for securing said first support member to a pickup truck cap cross brace, said first clamping means including a pair of serrated jaws disposed on opposite sides of said first support member and a threaded fastener extending through said spaced apertures of said first support member and through said jaws for clamping said first support member to a pickup truck cap cross brace;

a plurality of spaced U-shaped notches formed in a bottom edge of said first support member;

a clamp bar pivotally mounted on said bottom edge of said first support member, between adjacent pairs of said U-shaped notches, opposite ends of said clamp bar movable to a position blocking said adjacent pair of U-shaped notches for selectively retaining a handle portion of a fishing rod in each of said notches;

a thumb screw pivotally mounting each of said clamp bars on said bottom edge of said first support member;

an elongated second support member;

a plurality of spaced apertures formed through said second support member;

second clamping means for securing said second support member to a pickup truck cap cross brace in spaced parallel relation with said first support member, said second clamping means including a pair of serrated jaws disposed on opposite sides of said second support member and a threaded fastener extending through said and through said jaws for clamping said second support member to a pickup truck cap cross brace second support member connecting said jaws;

a plurality of second spaced apertures formed through said second support member for receiving tip portions of fishing rods.

4,881,675

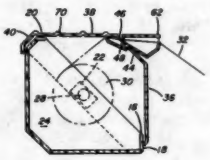
APPARATUS FOR DISPENSING STRIP MATERIAL FROM A ROLL

George J. Varley, III, 136 Locust St., McKees Rocks, Pa. 15136

Filed May 5, 1988, Ser. No. 190,579

Int. Cl.[4] A47K *10/36*

U.S. Cl. 225—43 **4 Claims**



2. Apparatus for dispensing a preselected length of strip material from a roll comprising,

a housing having a top wall and an elongated slotted portion, said top wall having an inner surface, said top wall inner surface having a strengthening means which includes an elongated recessed portion,

a bracket member having a rear edge portion with an upwardly flanged edge portion, said bracket member having a front edge portion with an upstanding cutting portion,

said bracket member positioned in said slotted portion of said housing with said rear edge portion within said housing and said front edge upstanding cutting portion positioned outside of said housing, and

said bracket member movably supported in said housing so that said upwardly flanged edge portion is movable into said recessed portion to frictionally engage said strip material therebetween while a preselected length of said strip material is severed along said front edge upstanding cutting portion.

4,881,676

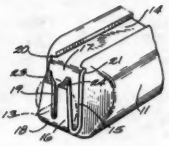
THUMBTACK TOOL

Larry St. Peter, 521 Division St., Hubbell, Mich. 49934

Filed May 16, 1988, Ser. No. 194,220

Int. Cl.[4] B25C *1/02*

U.S. Cl. 227—63 **8 Claims**



1. A tool for supporting a thumbtack having an enlarged head and a shaft extending away from the head, the tool comprising a body having a first elongated portion having a longitudinal axis and a forward end, said body also having a second generally elongated portion spaced from said forward end and extending laterally of said longitudinal axis in the form of a pistol grip, said forward end supporting means for releaseably gripping the thumbtack for insertion into a surface and for releaseably gripping the thumbtack for removal from a surface, said gripping means including a U-shaped clip member having a pair of parallel members joined by a bite portion, said parallel members being spaced apart nd adapted to slideably house at

least a portion of the head of the thumbtack therebetween, one of said parallel members including a portion slideably engaged with the forward end of said body and the other of said parallel members including a central slot adapted to house a portion of the shaft of the thumbtack with the pointed shaft of the thumbtack projecting forwardly through the slot away from the body.

4,881,677

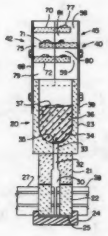
EXOTHERMIC WELDING APPARATUS INCLUDING A BAFFLE COVER ASSEMBLY

Michael D. Amos, Burton; Denis A. Brosnan, Solon; Mark V. Samas, Euclid; Richard E. Singer, Beachwood; James E. Whetsel, Bedford, and David P. Kovarik, Eastlake, all of Ohio, assignors to Erico International Corporation, Solon, Ohio

Continuation-in-part of Ser. No. 128,597, Dec. 4, 1987, which is a continuation-in-part of Ser. No. 30,169, Mar. 25, 1987, abandoned. This application Aug. 29, 1988, Ser. No. 237,080

Int. Cl.[4] B23K *23/00*

U.S. Cl. 228—33 **43 Claims**



1. Exothermic apparatus comprising a chamber, a crucible above said chamber, adapted to contain exothermic material and connected to said chamber by a tap hole, whereby when such exothermic material is ignited molten reaction products of said exothermic mixture flow through said tap hole to enter said chamber, and baffle cover means on said crucible operative to reduce the amount of smoke emitted from the crucible when the exothermic material is ignited, said baffle cover means comprising a plurality of interconnected expansion chambers reducing the velocity of the gases emitted from the crucible.

4,881,678

PROCESS FOR THE REMOTE-CONTROLLED SEMI-AUTOMATIC WELDING OF TWO ROTATIONALLY SYMMETRICAL COMPONENTS

Jean P. Gaudin, Chassieu, France, assignor to Framatome, Courbevoie, France

Filed Jan. 20, 1988, Ser. No. 145,991

Claims priority, application France, Jan. 20, 1987, 87 00590

Int. Cl.[4] B23K *9/02, 9/10*

U.S. Cl. 228—102 **5 Claims**

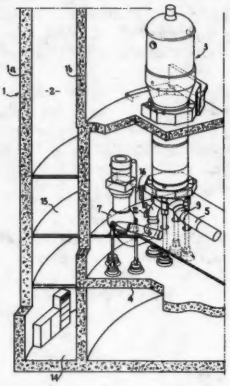
1. Process for the remote-controlled semi-automatic welding of two large-size rotationally symmetrical components (6, 10) by filling an annular chamfer (17) with a welding metal in successive shielded-arc orbital welding passes (20), making it possible to form layers of welding metal (18) in the chamfer (17) by placing metal beads (18) next to one another, each bead deposited during a pass being of a specific type, depending on its position in the chamfer (17), said process comprising performing the following steps, from a control station (14) located at a distance from the welding zone and managed by an operator, for each of the passes:

(a) setting the welding parameters, the type of pass and the values to be given to the parameters as a function of the type of pass being supplied to the operator by a storage memory means, in which the information relating to the welding operation is stored;

(b) checking that each of the welding parameters is set at a suitable value according to the type of pass;

(c) starting the welding operation manually and remotely;

(d) monitoring the welding operation continuously by means of a remote screen display (38, 40) of the welding zone;



(e) changing one or more welding parameters according to the image of the welding zone, the limits within which the parameters can be changed being supplied to the operator by the memory means; and

(f) stopping the welding operation manually when the image obtained on the screen (39, 40) corresponds to the end of a pass.

4,881,679

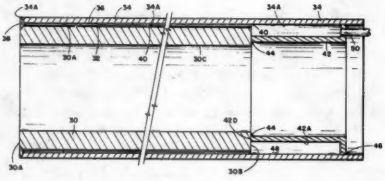
SUBASSEMBLY FOR USE IN MANUFACTURING A TUBULAR PRODUCT

William C. Turner, 85 Pinto La., Sedona, Ariz. 86336

Division of Ser. No. 920,594, Oct. 20, 1986, Pat. No. 4,765,529. This application Jul. 5, 1988, Ser. No. 180,312

Int. Cl.[4] B23K *1/00*

U.S. Cl. 228—132 **6 Claims**



1. For use in the manufacture of an externally clad tubular product a subassembly comprising:

a tubular metallic host having a first and second end, the external tubular surface being plated with a low melting point bonding metal alloy;

a tubular metallic cladding member having a first and second end, the cladding member being telescopically assembled over said tubular host and having the first end thereof circumferentially welded to the first end of said tubular host; and

a metallic tubular bag welded to said tubular host adjacent the second end thereof and to said cladding member adja-

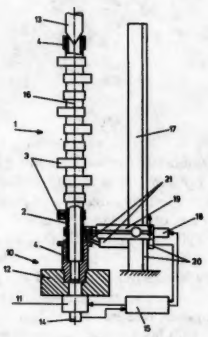
cent said second end forming a closed space including the annular area between the interior of said tubular cladding member and the exterior of said tubular host member, the tubular bag having a small diameter opening therein, said closed space being sufficiently evacuated and filled with an inert gas so that the water and oxygen therein is substantially at a level below a dew point of about −60° F.

4,881,680

PROCESS FOR THE PRODUCTION OF A COMPOSITE CAMSHAFT

Peter Toelke, Diessenhofen, and Walter Greulich, Uhwiesen, both of Switzerland, assignors to Georg Fischer AG, Schaffhausen, Switzerland

Filed May 6, 1988, Ser. No. 190,930
Claims priority, application Switzerland, May 7, 1987, 738/87
Int. Cl.[4] B23K *31/00*
U.S. Cl. 228—182 6 Claims



1. A process for the production of a composite camshaft having a plurality of cam elements mounted on a shaft at a desired locaion and a desired orientation comprising:

(a) providing an elongated shaft having a longitudinal axis and an outer circumferential surface configuration;

(b) providing a plurality of cam elements wherein each of said cam elements are provided with an internal bore having a size and configuration substantially similar to the outer circumferential configuration of said shaft;

(c) positioning said plurality of cam elements successively on said shaft;

(d) locating said shaft in a rotary drive means for rotating sahd shaft about its longitudinal axis;

(e) gripping one of said plurality of cam elements and locating said one cam element at a desired location along the longitudinal axis of said shaft;

(f) rotating said shaft so as to locate said one cam element at a desired orientation on said outer circumferential surface of said shaft at said desired location along the longitudinal axis thereof;

(g) bonding said one cam element on said shaft at said desired location and orientation;

(h) releasing said gripping means from one cam elements; and

(i) repeating steps (e), (f), (g) and (h) until all of said plurality of cam elements are secured on said shaft.

4,881,681

PROCESS FOR MODIFYING THE SURFACE OF METAL OR METAL ALLOY SUBSTRATES AND SURFACE MODIFIED PRODUCTS PRODUCED THEREBY

Robert B. Pond, Sr., 299 Ridge Rd., Westminster, Md. 21157

Filed Sep. 13, 1988, Ser. No. 243,608
Int. Cl.[4] B23K *23/00*
U.S. Cl. 228—198 2 Claims

1. A process for joining a plurality of reactive metal or reactive metal alloy substrates together, said process comprising:

disposing a powdered mixture comprising fly ash produced by combustion of fossil fuels between adjacent reactive metal or reactive metal alloy substrates; and

heating the substrates and powdered mixture at a temperature lower than a melting point or solidus temperature of said substrates, thereby producing a bonded structure having a hard bonding layer between said adjacent substrates.

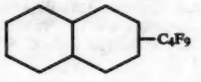
4,881,682

VAPOR PHASE SOLDERING WITH PERFLUORINATED BUTYL DERIVATIVE COMPOUNDS

Frank K. Schweighardt, Allentown, and Webb I. Bailey, Fogelsville, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Division of Ser. No. 89,475, Aug. 25, 1987, Pat. No. 4,777,304.
This application Jun. 6, 1988, Ser. No. 203,401
Int. Cl.[4] B23K *3/00*; C07C *19/08*
U.S. Cl. 228—242 11 Claims

1. In a method of soldering wherein a component to be soldered is immersed in a vapor bath to melt the solder, and the component is then withdrawn from the vapor bath, the improvement comprising that the vapor bath is composed substantially of a compound of the formula:



wherein the carbon rings are fully fluorinated, or mixtures thereof.

4,881,683

PAPERBOARD CONTAINER FOR SHIPPING MATERIAL IN BULK

Kent A. Linnemann, Cincinnati, Ohio, assignor to Shippers Paper Products Company, Loveland, Ohio

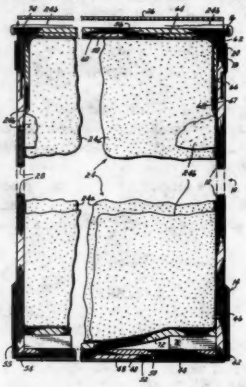
Filed Jan. 27, 1988, Ser. No. 148,928
Int. Cl.[4] B65D *5/36, 3/28*
U.S. Cl. 229—117.01 3 Claims

1. A bulk container comprising:

a base including an annular base rim and a circular center portion having a circumferential edge, said annular base rim being formed of multiple layers of paperboard laminated together and formed into a rigid right angle to provide a first upstanding leg forming an annulus about the base of the container, and a second leg at right angles thereto underlying said center portion, a cap including an annular top rim, said annular top rim being formed of multiple layers of paperboard laminated together and formed into a rigid right angle to provide a first downwardly projecting leg and a second leg at substantially right angles thereto, a generally cylindrical side wall having a top and a base and being comprised of a foldable paperboard sheet and a plurality of vertically aligned paperboard slats secured thereto in substantially edge abutting relation, each said slat comprising a plurality of layers of paperboard laminated together and folded upon itself and laminated to itself to provide a slat of predeter-

mined width and length having at least one rounded edge and being substantially flat,

said base of said side wall being insertable in between said first upstanding leg of said annular base rim and said cir-



cumferential edge of said center portion of said circular base and wedged therebetween, and

said side wall being foldable to a substantially flat condition for shipping and storing and being assembleable in said circular base into an upright container.

4,881,684

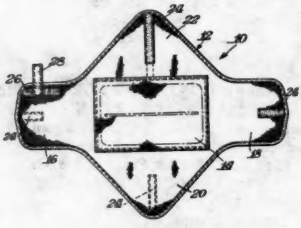
WRAPPER FOR ARTICLES WITH IMPROVED SECURING ARRANGEMENT

Carole Chinman, 922 Blackshire Rd., Wilmington, Del. 19805

Filed Jun. 30, 1988, Ser. No. 214,008

Int. Cl.[4] B65D *65/10*; A45F *5/10*

U.S. Cl. 229—87 A **31 Claims**



1. In a wrapper for articles wherein a flexible member has a reinforced central area and a plurality of wing sections extending outwardly from the central area, the wing sections being foldable over the reinforced portion of the central area in overlapping relation with each other to form a closed container for articles placed therein, the wing sections comprising a lower flap and an upper flap and a pair of intermediate side flaps, each flap having opposing faces, fastening means on each of the flaps for maintaining the flaps in a folded condition when said fastening means is in the closed condition of said wrapper, the improvement being in that said fastening means including adjustable securing means for securing said lower flap and said side flaps together to form an envelope of adjustable thickness which is open at its top side, said fastening means selectively securing said upper flap to the remaining flaps to close said envelope whereby said wrapper functions as an adjustable briefcase, said securing means including a permanent securing strip permanently mounted on one of said side flaps on a face of said side flap opposite its face having its fastening means, and a detachable securing strip selectively mounted to said permanent securing strip during periods of non-use and mounted to said permanent securing strip and to said fastening means on one of said flaps other than said upper flap and said side flap having said permanent securing strip.

4,881,685

PACKAGING CONTAINER

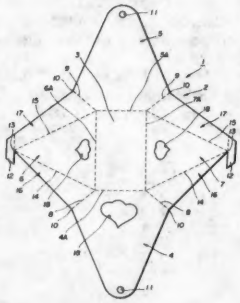
Sakai Isao, No. 2-11, 1-chome, Nishiogi-minami, Suginami-ku, Tokyo, Japan

Filed Dec. 30, 1988, Ser. No. 292,245

Claims priority, application Japan, Apr. 4, 1988, 63-44793[U]

Int. Cl.[4] B65D *5/20, 5/46*

U.S. Cl. 229—115 **3 Claims**



1. A packaging container formed by folding a blank comprising a rectangular bottom wall and four lateral walls each extending from one of the four sides of said bottom wall and by fastening the top ends of said lateral walls with a staple,

wherein the four sides of said bottom wall constitute respectively bases of said four lateral walls which consist of a front wall, a rear wall and a pair of opposite side walls; boundaries between adjacent said lateral walls have equal length and intersect respective said bases at an angle of 45 degrees; each said lateral wall tapers toward the top end thereof with the maximum width being a distance between points where the side edges of adjacent said lateral walls are joined together; each of said side walls has a projection at the top end thereof and a pair of laps formed outside of two equal sides, respectively, of an isosceles triangle which is defined by linking the ends of said base and an apex of said side wall positioned below said projection; and said blank is folded along said bases and said boundaries to raise said lateral walls with respect to said bottom wall, said side walls being folded along said equal sides in such a manner that said laps face and abut said front and rear walls, respectively, with said projections being sandwiched between the top ends of said front and rear walls, whereby a staple fastens said projections and said top ends together.

4,881,686

TEMPERATURE RECOVERY DISPLAY DEVICE FOR AN ELECTRONIC PROGRAMMABLE THERMOSTAT

Vinay Mehta, Germantown, Tenn., assignor to Hunter-Melnor, Inc., Memphis, Tenn.

Filed Oct. 13, 1988, Ser. No. 256,987

Int. Cl.[4] F23N *5/20*

U.S. Cl. 236—46 R **15 Claims**

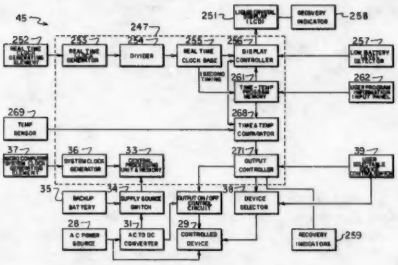
1. A programmable thermostat which controls an air conditioning system for a predetermined volume of space, said thermostat comprising:

sensor means for sensing the ambient temperature of the predetermined volume of space;

timing means for generating the current time of day;

a digital memory for storing a plurality of program times and at least one control temperature corresponding to each of the plurality of program times;

control means for controlling the on/off switching of said air conditioning system in response to (1) a comparison of the current time of day with the program times stored in said digital memory means to access the corresponding current control temperature stored in said digital memory means



and (2) a comparison of the current ambient temperature sensed by said sensor means with the current control temperatures stored in said memory means;

a temperature recovery means for activating and controlling said air conditioning system prior to a given program time to bring the ambient temperature to the predetermined volume of space to a control temperature corresponding to the given program time by the given program time; and

a display device including visual indicator means for visually indicating when said temperature recovery means has activated and is controlling said air conditioning system.

4,881,687

PORTABLE LIQUID SPRAYER, PARTICULARLY FOR THE TREATMENT OF PLANTS

Patrick J. M. Ballu, Reims, France, assignor to Tecnoma, Epernay, France

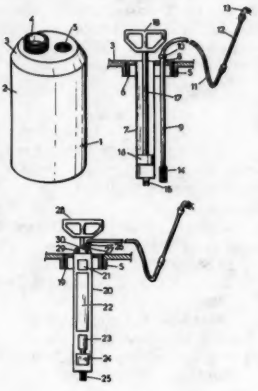
Filed Jun. 20, 1988, Ser. No. 209,197

Claims priority, application France, Jun. 29, 1987, 87 09126

Int. Cl.[4] B05B *9/043*

U.S. Cl. 239—332 **8 Claims**

1. Sprayer comprising a container capable of containing a liquid, a lance connected to the container by a flexible tube, and two means for delivering the liquid under pressure into the tube, said means being capable of use alternately in place of one another and one of said means comprising a hand pump capable of pressurizing the interior of the container, and means for sealingly fastening said pump in the container, the other of said delivering means comprising an electric pump capable of taking the liquid from the container and delivering the liquid under pressure into the lance without pressurizing said container, and means for fastening said pump in the container, the



container being capable of withstanding the pressure generated by the hand pump.

4,881,688

DEVICE FOR INSULATING THE SPRAY LIQUID SOURCE FROM THE HIGH TENSION VOLTAGE OF AN ELECTROSTATIC SPRAY SYSTEM WHEN USING AN ELECTRICALLY CONDUCTIVE SPRAY LIQUID

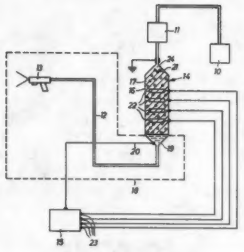
Bo A. Hankvist, Stockholm; Peter N. Kling, Nacka, and Rolf T. Spongh, Tyresö, all of Sweden, assignors to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Oct. 31, 1988, Ser. No. 265,226

Claims priority, application Sweden, Nov. 4, 1987, 87043097

Int. Cl.[4] B05B *5/02*

U.S. Cl. 239—691 **5 Claims**



1. Device for insulating a spray liquid source from a high tension voltage of an electrostatic spray system when using an electrically conductive spray liquid, comprising:

a spray gun (13) connected to a high potential and to a supply line (12) which connects the spray gun (13) to a spray liquid source (10), and which includes a vessel (16) containing a barrier forming liquid (17) of low electrical conductivity and a density other than that of the spray liquid;

a spray liquid injection means (21) for disintegrating the spray liquid into drops, and located at an inlet end (24) of said vessel (16);

said vessel (16) being substantially non-conductive between its inlet end (24) which is connected to ground potential

and an outlet and thereof (19) which is connected to the same high potential as the spray gun (13); and

electrode means (22; 25) provided between the inlet end (24) of said vessel (16) and the outlet end (19) of said vessel (16), for exposing the spray liquid to at least one intermediate potential for controlling the tension gradient in the barrier forming liquid by limiting and controlling the charging of the spray liquid.

4,881,689

METHOD FOR SETTING THE GRINDING ROLLERS IN ROLLER FRAMES OF A FLOUR MILLING PLANT, AS WELL AS FLOUR MILLING PLANT FOR PERFORMING THE METHOD

Christian Lippuner, CH-9244 Niederuzwil, Switzerland, and Werner Baltensperger, CH-9242 Oberuzwil/Schweiz, Switzerland, assignors to Gebrueder Buehler AG, Switzerland

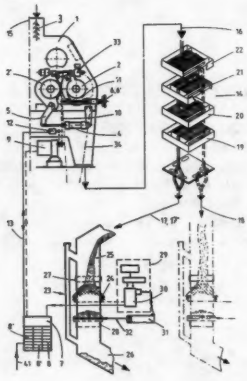
PCT No. PCT/EP86/00112, § 371 Date Nov. 4, 1986, § 102(e) Date Nov. 4, 1986, PCT Pub. No. WO86/05416, PCT Pub. Date Sep. 25, 1986

PCT Filed Mar. 5, 1986, Ser. No. 12,663

Claims priority, application Switzerland, Mar. 15, 1985, 01164/85; Fed. Rep. of Germany, May 31, 1985, 3519625

Int. Cl.⁴ B02C *9/04, 21/00*

U.S. Cl. 241—9 **16 Claims**



1. In a method for setting spacings of grinding rollers in rolling frames of a cereal milling plant, the rolling frames being followed by a screening system, from which is tapped a test signal and supplied to a computer, which compares it with a stored desired value and, in the case of a difference, by means of a control signal and adjusting means, automatically adjusts the spacings of the grinding rollers, the improvement comprising deriving the test signal only from the material which passes through the screening system or from the material which does not pass through the screening system and supplying the test signal only from certain selected key passages of the screening system to the computer.

4,881,690

WASTE COMMINUTING APPARATUS

Henry C. Maier, Seaford, Australia, assignor to Liangtraco (Aust) Pty. Ltd., Victoria, Australia

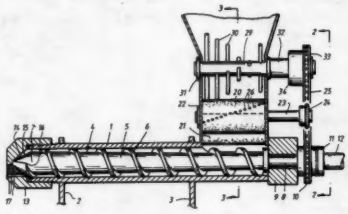
Filed Aug. 15, 1988, Ser. No. 232,095

Claims priority, application Australia, Jan. 28, 1988, PI6494

Int. Cl.⁴ B02C *7/04*

U.S. Cl. 241—82.3 **12 Claims**

1. A comminuting apparatus comprising an elongate cylindrical barrel, an extrusion screw mounted for rotation within said barrel, means for rotating said screw within said barrel, inlet opening means at one end of said barrel through which material to be comminuted may be presented to the extrusion screw, and means for closing the other end of said barrel having openings through which comminuted material is forced by said extrusion screw, said extrusion screw having a generally helical flight extending from one end of the screw to the other and having a substantially constant pitch and a flight depth which reduces towards the closed end of the barrel whereby the material to be comminuted is increasingly compressed and



comminuted, said extrusion screw also having a shaped end portion housed within said closed end of said barrel, said shaped end portion and said closed end of said barrel being shaped to provide a space therebetween; and recirculation means for recirculating partly comminuted material into said space, said recirculating means comprising edge means formed in said end portion of said extrusion screw at an acute angle to the longitudinal axis of said screw.

4,881,691

TRANSFER STATION WITH LIFTING DEVICES

Michael Oldengott, Witten; Jörg Schade, Herten, and Peter Stephan, Oer-Erkenschwick, all of Fed. Rep. of Germany, assignors to Klockner-Becorit GmbH, Castrop-Rauxel, Fed. Rep. of Germany

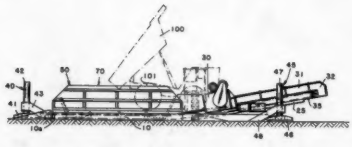
Continuation of Ser. No. 837,292, Mar. 7, 1986, abandoned. This application Oct. 22, 1987, Ser. No. 111,131

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1985, 3508890

The portion of the term of this patent subsequent to Jun. 2, 2004, has been disclaimed.

Int. Cl.⁴ B02C *23/02*

U.S. Cl. 241—101.5 **7 Claims**



1. A transfer station for processing debris which comprises a unitary, rigid elongated main frame which includes two parallel, rectilinear beam members and defines a front end and a rear end; a conveyor which is movably mounted between said rectilinear beam members of said frame; a crusher mechanism mounted above said elongated main frame for crushing debris deposited on said conveyor; a feeder box positioned at said front end of said elongated main frame, said feeder box including separate feeder devices located on opposite sides of said elongated frame, each feeder device including a box compartment which is pivotally connected to said elongated main frame to be in either a non-tilted or in a tilted orientation, a ground plate below the box compartment which is pivotally connected to said elongated main frame so as to pivot about an axis extending in parallel with said elongated main frame, and

a hydraulic cylinder connected between said ground plate and said box compartment thereabove; and a plurality of hydraulic lifting devices for separately raising and lowering each of the front and rear ends of said elongated main frame relative to the ground, each of said pluraity of hydraulic lifting devices comprising a ground-engaging base, a vertical cylinder, and a lifting arm which is fixedly attached to said main frame, said lifting devices functioning to lower said main frame so that both the front and rear ends thereof are in contact with the ground, thereby positioning the transfer station in an operational mode, and to lift both the front and rear ends of said elongated main frame above the ground such that the transfer station is in a transport mode, said transfer station having no elements that extend below said elongated main frame when in said operational mode.

4,881,692

STRIPPING MEANS FOR SHREDDING MACHINE OR THE LIKE

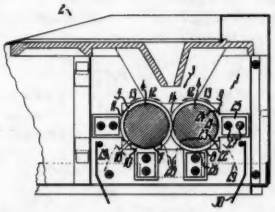
Albert Goldhammer, Ueberlingen; Hans Schleicher, Markdorf; Hartmut Stangenberg, Owingen, and Rolf Gasteier, Markdorf, all of Fed. Rep. of Germany, assignors to Feinwerktechnik Schleicher & Co., Fed. Rep. of Germany

Filed Mar. 3, 1988, Ser. No. 163,737

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1987, 3706862

Int. Cl.[4] B02C *18/22*

U.S. Cl. 241—167 **32 Claims**



1. A stripping means in combination with at least one shredding roller of a shredding machine having a shredding zone for material to be comminuted, said shredding roller having annular slots located between shredding disks and defining a longitudinal direction, a circumferential direction and rotational operating direction, said combination comprising:

a plurality of stripper members, each of said stripper members engaging in an annular slot of said shredding roller, said stripper members forming adjacent primary strippers located adjacent to one another with respect to said longitudinal direction and closest to said shredding zone with respect to said rotational operating direction, wherein at least several of said primary strippers are displaced with respect to one another in said circumferential direction of said shredding roller.

4,881,693

SPOOLING MACHINE WITH A PLURALITY OF WINDING HEADS

Kresimir Mista, Heusenstamm, Fed. Rep. of Germany, assignor to Karl Mayer Textilmaschinenfabrik GmbH, Obertshausen, Fed. Rep. of Germany

Filed Jun. 3, 1988, Ser. No. 202,196

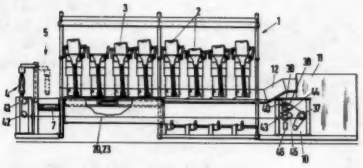
Claims priority, application Fed. Rep. of Germany, Jun. 6, 1987, 3719091

Int. Cl.[4] B65H *67/06*

U.S. Cl. 242—35.5 A **13 Claims**

1. In a spooling machine having a plurality of cop-utilizing winding heads and a delivery point for cops, a forwarding means for transporting the cops from the delivery point to a selected one of said cop-utilizing winding heads in response to a routing signal signifying said selected one of said winding heads, said forwarding means comprising:

a drive means operating over the path between the delivery point and the winding heads, said drive means including a control motor having an input for receiving said routing signal and controlling said motor, said motor being intermittently operable to an extent determined by said routing signal; and



a moveable or slidable transport arrangement mounted to move along a conveyor path, said transport arrangement being coupled to and driven by said drive means, said transport arrangement comprising:

(a) a takeup means coupled to said drive means for holding one of said cops; and

(b) a discharge means coupled to said drive means and mounted alongside said takeup means for discharging the cops at one of said winding heads, so that said transport arrangement can transport cops from said delivery point to said selected one of said winding heads.

4,881,694

YARN TRAVERSING APPARATUS FOR A WINDING MACHINE

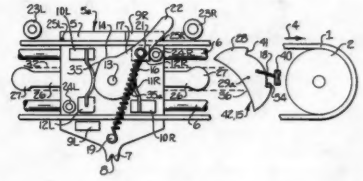
Klaus Bartkowiak, Herne; Joachim Graf, Remscheid; Friedrich Urbahn, Remscheid, and Klaus Weber, Remscheid, all of Fed. Rep. of Germany, assignors to Barmag, AG, Remscheid, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 130,062, Dec. 8, 1987. This application Sep. 15, 1988, Ser. No. 245,001

Claims priority, application Fed. Rep. of Germany, Sep. 16, 1987, 3731115; Oct. 9, 1987, 3734235; Dec. 8, 1987, 3741544; Jan. 27, 1988, 3802267; Mar. 8, 1988, 3807535; Apr. 22, 1988, 3813534; Apr. 22, 1988, 3813602; May 25, 1988, 3817639; Jun. 9, 1988, 3819675; Jul. 8, 1988, 3823169

Int. Cl.[4] B65H *54/28*

U.S. Cl. 242—43 R **33 Claims**



1. A yarn traversing apparatus adapted for guiding a running yarn onto a rotating core to form a core supported package, and comprising

a machine frame,

yarn guide means including a yarn guide,

means mounting said yarn guide means to said frame for back and forth movement along a stroke path,

drive means for moving said yarn guide means back and forth along said stroke path, and

energy recovery means for recovering the kinetic energy of said yarn guide means during its reversal of movement at

each end of the stroke path, said energy recovery means comprising

(a) mass means movably mounted to one of said frame and said yarn guide means,

(b) contact means mounted to the other of said frame and said yarn guide means, and

(c) cooperating surface means on said mass means and said contact means for providing a positive drive connection therebetween during each reversal of movement of said yarn guide means and so as to transmit kinetic energy from said yarn guide means to said mass means as the yarn guide means approaches each end of said stroke path to thereby impart movement to said mass means, and then retransmit the resulting kinetic energy from said moving mass means to said yarn guide means to thereby cause said yarn guide means to move away from each end of said stroke path.

4,881,695

UNWINDING APPARATUS FOR PAPER OR BOARD WEB ROLLS

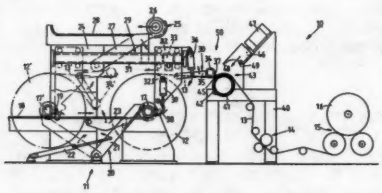
Rudolf Beisswanger, Steinheim, Fed. Rep. of Germany, assignor to J.M. Voith GmbH, Heidenheim, Fed. Rep. of Germany

Filed Jul. 18, 1988, Ser. No. 220,327

Claims priority, application Fed. Rep. of Germany, Jul. 17, 1987, 3723601

Int. Cl.[4] B65H *19/18, 19/20*

U.S. Cl. 242—58.4 **12 Claims**



1. An apparatus for unwinding a paper web wound as a parent roll on a roll axle for subsequent handling by a succeeding rewind station, said apparatus comprising:

an unwinding unit having guideway means for receiving the ends of the roll axle of the parent roll, the parent roll being movable between a waiting position and an unwinding position on said guideway means;

means for moving the parent roll from the waiting position to the unwinding position;

separating means for separating the web unwound from the parent roll substantially perpendicularly to the direction of web travel;

holding means for holding the end of the unwound web parallel to the roll axle on web standstill;

lifting means for lifting out of the unwinding position the roll axle of an expired parent roll whose unwound web has been separated by said separating means;

joining means for joining the end of an unwound web to the beginning of the web of a parent roll located in the unwinding position, said joining means including splicing means having a cross member arranged substantially parallel to the roll axle for receiving the beginning of the web of a parent roll located in the waiting position; and

a carriage movable substantially parallel to said guideway means and carrying said splicing means, said carriage having a dog engaging an end of the roll axle such that the parent roll in moving from the waiting position to the unwinding position move said carriage and the cross member of said splicing means with the beginning of the web against said holding means with the end of the unwound web, such that the webs come to lie one above the other and are joined together.

4,881,696

MECHANISM FOR PREVENTING LOOSENING OF TAPE IN A TAPE CARTRIDGE

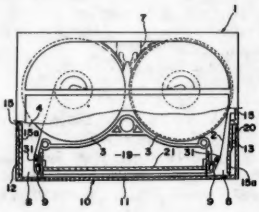
Hikaru Mizutani, Osaka, and Yoshimi Maehara, Kyoto, both of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Continuation of Ser. No. 825,551, Jan. 23, 1986, abandoned. This application Dec. 21, 1987, Ser. No. 139,159

Claims priority, application Japan, Jan. 26, 1985, 60-9779

Int. Cl.[4] G11B *23/087*

U.S. Cl. 242—199 **9 Claims**



1. A tape cartridge consisting of a case body including a top half and a bottom half, a pair of tape reels having a tape wound thereon, an opening defined at a front portion of said case body for drawing said tape therethrough by a front lid in a closed positon and an inner cover lid movably coupled to said front lid, vertical suspended walls from said top half and vertical standing walls projecting from said bottom half on either side of said inner cover lid such that when said top half and bottom half are combined together to form said case body said suspended walls combine with said standing walls to form side walls lateral to said inner cover, a pair of tape guides provided at each lateral side of said front portion of said case body in front of said vertical standing walls for guiding said tape along a predetermined path through said front portion opening of said case body and at least one pressure means for preventing loosening of said tape comprising a base portion and a free end portion, said at least one pressure means for preventing loosening of said tape being juxtapositioned to a corresponding one of said tape guides between said respective tape guide and corresponding tape reel for slidably and resiliently contacting an inner or back surface of said tape immediately before or after said tape passes over said corresponding tape guide such that said at least one pressure means maintains a constant force in an outward direction against said tape due to the flexible nature of said pressure means thereby preventing loosening of said tape as the amount of tape on said tape reels changes while eliminating the need for a tape guide pin.

4,881,697

REEL WITH STARTING FORCE SPRING CASTING

Kyoichi Kaneko, Tokyo, Japan, assignor to Daiwa Seiko, Inc., Tokyo, Japan

Filed Jun. 13, 1988, Ser. No. 205,475

Claims priority, application Japan, Jul. 1, 1987, 62-165024; Oct. 6, 1987, 62-253318

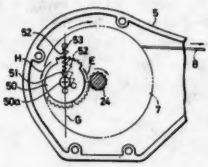
Int. Cl.[4] A01K *89/01*

U.S. Cl. 242—254 **3 Claims**

1. A casting reel including a spool which is free-rotatably supported by a reel body and can be rotated for winding-up of a fishing line by a rotation operating mechanism built in the reel body,

characterized by a spool forcibly rotating unit composed of an operating member rotatably attached to the reel body, a spring member for applying a spool starting torque to the operating member, a first gear provided on the spool, and a segment gear secured to an end of said operating member, wherein said segment gear intermittently engages said first gear to transmit the spool starting torque of

the operating member to the spool, said spool forcibly rotating unit being provided in the reel body for rotating



the spool in the direction of paying out the line at the beginning of releasing the line.

4,881,698

FISHING REEL INCLUDING A ONE-WAY BRAKE

Gerald J. Doiron, 40 Franklin St., Athol, Mass. 01331

Filed Feb. 1, 1988, Ser. No. 151,156

Int. Cl.[4] A01K *89/015, 89/02*

U.S. Cl. 242—256 **1 Claim**

1. A fishing reel comprising a housing, a spool mounted therein, a spindle for the spool, said spindle having an axis, a handle connected to the spindle for turning the spool, and a connection between the spindle and handle,

said connection comprising a removable circular ratchet member on the handle and a series of parallel, mutually peripherally spaced grooves on the spindle, a separate element in the ratchet, means mounting the element for limited motion to and from the grooves, and an abutment on the member to contact and apply pressure to the element to tend to move the element to firm contact in a groove, or selectively to relax pressure on the element to allow it to be loose in its mounting means so that the spool is enabled to rotate freely,

the means mounting the element being in the form of a blind hole intersecting the spindle in the area of the grooves, the blind hole being tangential to the spindle axis, and an O-ring on the ratchet member closing the blind hole.

4,881,699

ROTOR-LOCKING MECHANISM FOR A FISHING REEL

Masaharu Emura, Hiroshima, Japan, assignor to Ryobi Ltd., Hiroshima, Japan

Continuation of Ser. No. 792,924, Oct. 30, 1985, abandoned. This application Dec. 16, 1987, Ser. No. 134,545

Claims priority, application Japan, Oct. 31, 1984, 59-166139[U]

Int. Cl.[4] A01K *89/01*

U.S. Cl. 242—248 **3 Claims**

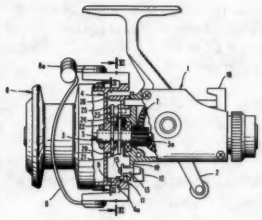
1. A spinning-type fishing reel comprising:

a reel body;

a rotor rotatably mounted on said reel body for rotation in a line-winding direction and for rotation in a line-casting direction opposite said line-winding direction;

rotor locking means mounted on said reel body for selectively preventing rotation of said rotor in said line-winding direction, said rotor locking means including a projection extending along an inner surface of said rotor, a pivoting arm pivotally mounted on said reel body for engaging said projection; spring means for applying a resilient force to oppose rotation of said pivoting arm in both directions of rotation of said pivoting arm; and lever means connected to said pivoting arm for selectively pivoting said pivoting arm into engagement with said rotor to prevent rotation of said rotor in said line-winding direction; and

self-centering means for preventing rotation of said rotor in



said line-casting direction, said self-centering means including a ratchet gear; a centering ratchet having a circumferential face and a tooth formed thereon; a backstop pawl disposed to selectively engage said ratchet gear; a centering pawl disposed to selectively engage said centering ratchet; a cam adapted to selectively engage said backstop pawl and said centering pawl with said ratchet gear and said centering ratchet, respectively; and tooth springs disposed to bias said centering pawl to allow said centering pawl to engage said tooth in the neutral position when said backstop pawl is released from said ratchet gear.

4,881,700

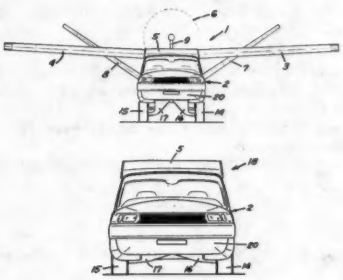
CONVERTIBLE FIXED WING AIRCRAFT

Branko Sarh, 2597 Devonshire Rd., Riverside, Calif. 92506

Filed Jan. 5, 1988, Ser. No. 141,096

Int. Cl.[4] B64C *3/56, 37/00*

U.S. Cl. 244—2 **11 Claims**



1. A convertible fixed wing aircraft comprising, in combination:

a fuselage of generally rectangular planform having a pair of steerable front wheels and a pair of rear wheels, said fuselage enclosing a passenger compartment having front and rear seats;

a middle box attached to the roof of said fuselage substantially over the center of gravity of the loaded vehicle and

elevated above said passenger compartment so that the space between front and rear seats is substantially unobstructed;

a telescopic wing attached to said middle box and projecting laterally therefrom on opposite sides, said wing comprising a plurality of wing sections that telescope into one another, thereby retracting the wing from an extended flight configuration to a retracted automotive configuration telescoped within the middle box wherein the wing tips are spaced apart no more than the allowable highway width limitation;

horizontal and vertical stabilizer means mounted at the rear end of said fuselage and retractable to a total width no greater than the allowable highway width limitation;

energy absorbing bumpers fixed to the front and rear ends of said fuselage beyond the fore and aft extremities of the retracted components;

a propeller;

an engine and transmission means alternatively connecting the engine to either said propeller or to one of said pairs of wheels; and

control means for controlling the aircraft when in the flight configuration, or for controlling the vehicle when in the automotive configuration.

4,881,701

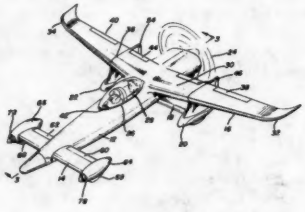
COMBINATION AUTOMOBILE AND AIRPLANE

Gary M. Bullard, Rte. #1, Box 177, Accomac, Va. 23301

Filed Mar. 14, 1988, Ser. No. 168,015

Int. Cl.[4] B64C *3/56*

U.S. Cl. 244—49 **7 Claims**



1. A convertable airplane to automobile for air flight and road use, comprising;

a fuselage having a cockpit, a forward end and a rearward end,

a canard wing mounted on the forward end of said fuselage, steerable wheels mounted on the ends of said canard wing,

a foldable wing mounted on said rearward end of said fuselage,

a vertical stabilizer means connected to the underside of said foldable wing, and

powered drive wheels mounted in said vertical stabilizers for automobile mode.

4,881,702

READILY CONVERTIBLE AIRCRAFT PASSENGER SEATS

Richard J. Slettebak, Kirkland, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Dec. 29, 1987, Ser. No. 139,282

Int. Cl.[4] A47C *15/00*

U.S. Cl. 244—118.6 **25 Claims**

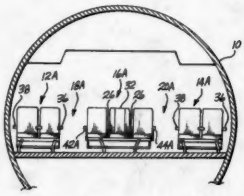
1. An aircraft passenger seat assembly convertible between two side-by-side seats and three side-by-side seats, comprising:

support leg structure for a seat cushion support frame;

a seat cushion support frame on said support structure, said seat cushion support frame having a fixed central portion secured to the support structure and opposite end portions movable in and out relative to the fixed central portion;

three side-by-side seat cushions on said seat cushion support frame, with the center cushion being on the fixed central portion of the frame and with the two outside seat cushions being on the movable end portions of the frame,

whereby the end portions of the frame can be moved inwardly to move with them the outer seat cushions and place said outer seat cushions against the center seat cushion, so that the three seat cushions can define two side-by-side sitting areas, and with the outer frame portions being movable outwardly from the fixed center frame portion for the purpose of moving the outer seat cushions away from the center seat cushion, so that each of the three seat cushions can define a separate seating area.



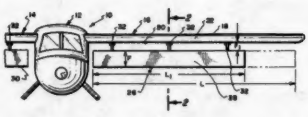
4,881,703

AIRCRAFT FLAP ASSEMBLY

Roger A. Nahas, 17001 Adlon Rd., Encino, Calif. 91436

Filed Jun. 27, 1988, Ser. No. 211,557

Int. Cl.[4] B64C *3/58*

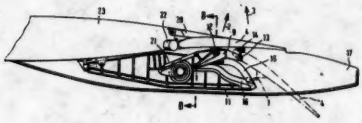
U.S. Cl. 244—213 **1 Claim**

1. In combination with an aircraft wing, said aircraft wing having a leading edge and a trailing edge, said aircraft wing having a top surface and an undersurface, said undersurface being substantially planar, a flap assembly hingedly mounted on a hinge axis on said undersurface, said flap assembly including a single flap, said flap being essentially planar, said flap being elongated and narrow and when deployed against the airstream causes substantial resistance to the moving of the aircraft wing through the air, said flap being movable from a stowage position to a deployed position, said stowage position being when the plane of said flap is located parallel to the plane of said undersurface of said aircraft wing, said deployed position being when the plane of said flap is positioned across the airstream with said flap being spaced from said undersurface and located perpendicular to said undersurface , said flap assembly including an air gap area between said flap and said undersurface with said flap in said deployed position, said aircraft wing having a cord "C" and a length "L", said flap having a length "L_1" and a cord "F", the depth between said undersurface and said flap of said air gap area being substantially constant and defined as "F_1", the improvement comprising:

the surface area of said flap (FxL_1) facing into the airstream is between the range of one-fourth to one-sixth of the wing area (CxL), said hinge axis being located at five-eighths of the cord (C) from said trailing edge.

4,881,704
LANDING FLAP SYSTEM

Gerhard Hofrichter, Bremen, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm GmbH, Bremen, Fed. Rep. of Germany

Filed Apr. 21, 1988, Ser. No. 184,197
Claims priority, application Fed. Rep. of Germany, Apr. 22, 1987, 3713465
Int. Cl.[4] B64C 3/38
U.S. Cl. 244—213 5 Claims

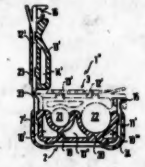


1. A landing flap system in an aircraft wing, the aircraft having a longitudinal axis, there being an upper and a lower track and a drive means, a tandem, flap moving carriage, comprising:
an inner carriage having a plurality of rollers for running on the upper track;
an outer carriage having at least two rollers for running on the lower track;
said rollers each having an axis;
hinge means for interconnecting the inner carriage and the outer carriage, for hinging about an axis that extends parallel to said axes of said rollers;
said hinge means connecting the carriages to the landing flap;
second hinged connect means for connecting the outer carriage to the landing flap in a second downstream connection point;
thrust rod and tension means hingedly connecting the outer carriage to the drive means; and
further rollers arranged at an acute angle to an axis that extends vertically to said roller axes and to a particular axis that is parallel to said longitudinal axis of the craft, the further rollers stabilizing and thereby balancing the positions of the carriages.

4,881,705
PLASTIC HOLDING ELEMENT

Willibald Kraus, Grunstadt, Fed. Rep. of Germany, assignor to TRW United Carr GmbH, Alsenborn, Fed. Rep. of Germany

Filed Mar. 17, 1988, Ser. No. 169,417
Claims priority, application Fed. Rep. of Germany, Mar. 18, 1987, 3708864
Int. Cl.[4] F16L 3/12
U.S. Cl. 248—74.2 7 Claims

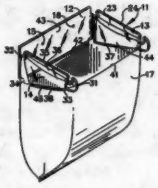


1. A plastic holding element mounting at least one tube member on a support, comprising a relatively rigid moulded plastic body having a tube bearing portion and a mounting portion for attaching the body to a support, the holding element bearing portion having at least one inlay defining a tube engaging surface formed of softer material than the plastics of the holding element, characterized in that the inlay (7,7';13,13') is formed of softer and less rigid material than the plastics of the holding element and that the inlay is permanently connected and bonded to a surface of the bearing portion (3,3') through at least one key type connecting element (8;9) by being directly moulded to said connecting element and said surface by a two component moulding process.

4,881,706
HOLDER FOR HANDLE BAGS

Brian R. Sedlik, 3170 Madison, Apt. 4, Carlsbad, Calif. 92008

Filed Jul. 5, 1988, Ser. No. 215,284
Int. Cl.[4] B65B 67/12
U.S. Cl. 248—99 17 Claims

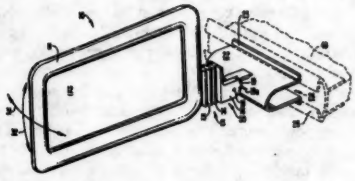


14. The apparatus recited in claim 1, and further comprising means for pivotably mounting said first and second side arm members to said back plate, said pivotable mounting means further comprising means for removably connecting said first and second side arm members to said back plate.

4,881,707
SIGN HOLDER DEVICE

Benjamin L. Garfinkle, Alameda, Calif., assignor to Clamp Swing Pricing Co., Alameda, Calif.

Filed Feb. 23, 1989, Ser. No. 314,379
Int. Cl.[4] A47B 96/00
U.S. Cl. 248—221.4 7 Claims



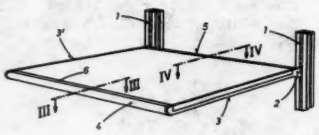
1. A sign holder assembly comprising in combination:
(a) a frame member capable of supporting and displaying a sign in a substantially vertical orientation;
(b) hinge means for supporting said frame member and for maintaining said frame member in a substantially vertical orientation, said hinge means being further characterized as comprising a plurality of stria formed of a flexible material, said stria connecting adjacent rib sections enabling said hinge means to flex horizontally in response to a horizontally applied impact being applied to said frame member but preventing significant flex in a vertical direction;
(c) attachment means for securing said frame member through said hinge means to a substantially horizontally oriented shelf; and
(d) connector means for attaching said hinge means to said attachment means, said connector means being capable of allowing rotation of said frame member about a horizontal axis while maintaining said frame member in a substantially vertical orientation.

4,881,708

SHELF FOR DISPLAYING ARTICLES

Herbert Walter, Müllheim, Fed. Rep. of Germany, assignor to Protoned B.V., Amsterdam, Netherlands

Filed Nov. 18, 1987, Ser. No. 122,356
Claims priority, application Switzerland, Nov. 19, 1986, 4622/86-2
Int. Cl.[4] A47H 29/02
U.S. Cl. 248—243 19 Claims



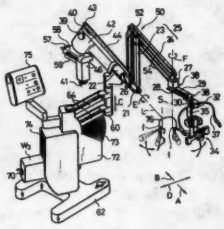
1. A display shelf adapted to be removably attached to a supporting device, comprising an overhanging frame structure including a first bracket extending along one side of said frame structure, a second bracket extending along an opposite side of said frame structure, a first cross member extending between said first and second brackets adjacent one end of said frame structure, said first cross member having a first pocket formed integrally therewith, a first flange extending toward an opposite end of said frame structure from a first inner leg positioned on one side of said first pocket and a first outer leg positioned on an opposite side of said first pocket, a second cross member extending between said first and second brackets adjacent said opposite end of said frame structure, said second cross member having a second pocket formed integrally therewith, a second flange extending toward said one end of said frame structure from a second inner leg positioned on one side of said second pocket and a second outer leg positioned on an opposite side of said second pocket, first supporting means for supporting said first cross member between said first and second brackets, said first supporting means including a first support member attached to said first bracket at a point located underneath said first flange and extending from said first bracket toward said second bracket, said first support member being received within said first pocket such that said first cross member is in bearing and clamping engagement with said first support member, which is substantially covered by said first outer leg, and a second support member attached to said second bracket at a point located underneath said first flange and extending from said second bracket toward said first bracket, said second support member being received within said first pocket such that said first cross member is in bearing and clamping engagement with said second support member, which is substantially covered by said first outer leg, and second supporting means for supporting said second cross member between said first and second brackets, said second supporting means including a third support member attached to said first bracket at a point located underneath said second flange and extending from said first bracket toward said second bracket, said third support member being received within said second pocket such that said second cross member is in bearing and clamping engagement with said third support member, which is substantially covered by said second outer leg, and a fourth support member attached to said second bracket at a point located underneath said second flange and extending from said second bracket toward said first bracket, said fourth support member being received within said second pocket such that said second cross member is in bearing and clamping engagement with said fourth support member, which is substantially covered by said second outer leg, and a shelf rest element releasably supported on said frame structure by said first and second flanges.

4,881,709

STAND MECHANISM FOR A MEDICAL OPTICAL EQUIPMENT

Katushige Nakamura, Hachioji, Japan, assignor to Mitaka Kohki Company Ltd., Mitaka, Japan

Filed May 19, 1988, Ser. No. 195,973
Claims priority, application Japan, May 29, 1987, 62-134500
Int. Cl.[4] E04G 3/00
U.S. Cl. 248—281.1 14 Claims



1. A stand mechanism for supporting medical optical equipment, comprising:

parallel linkage means for supporting said optical equipment upon one extremity end thereof, and having base end portions defined at an opposite extremity end thereof;

rotary shaft means, rotatable about a longitudinal axis thereof and having one end thereof connected to said base end portions of said parallel linkage means at predetermined locations along said longitudinal axis of said rotary shaft means such that said optical equipment is always focused upon a line which is an extension of said longitudinal axis of said rotary shaft means and wherein said parallel linkage means extends substantially radially outwardly from said longitudinal axis of said rotary shaft means in first direction with respect to said longitudinal axis of said rotary shaft means, for supporting said parallel linkage means and said optical equipment; and

counterweight means, movably mounted upon an opposite end of said rotary shaft means and extending substantially radially outwardly from said longitudinal axis of said rotary shaft means in a second direction opposite to said first direction of said parallel linkage means with respect to said longitudinal axis of said rotary shaft means, for counterbalancing the weight of said optical equipment and said parallel linkage means, and the moments created thereby, with respect to said longitudinal axis of said rotary shaft means when said parallel linkage means is transformed substantially within a plane which includes said parallel linkage means and said longitudinal axis of said rotary shaft means as a result of positional movement of said optical equipment, and when said optical equipment and said parallel linkage means are pivotably moved about said longitudinal axis of said rotary shaft means.

4,881,710

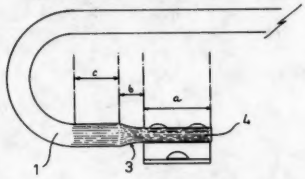
HANGER BRACKET

Clifford H. Ownby, 3615 Pittsburg, Houston, Tex. 77005, and Larry E. Lesher, 628 West Dr., Channelview, Tex. 77530

Continuation of Ser. No. 917,831, Oct. 10, 1986, abandoned.
This application Apr. 25, 1988, Ser. No. 185,344
Int. Cl.[4] A47F 5/08
U.S. Cl. 248—311.2 1 Claim

1. A bracket for supporting communication equipment from a vertical support surface in which the communication equipment can be adversely affected by magnetic fields, said bracket comprising an aluminum rod formed into a C shape, said rod being circular in cross section over a major portion of its length and including a straight middle portion and a pair of ends, each of said pair of ends being reversely bent inwardly

relative to said middle portion toward each other to form said C shape, said reversely bent ends being smoothly curved through 180°, each of said pair of ends including a reversely bent portion which is round in cross section, a straight portion parallel to said middle portion which is round in cross section, a smoothly tapered transition zone, and a terminal flattened end section, said smoothly tapered transition zone including a pair of opposed surfaces which diverge from the straight portion to the flattened end section and a pair of opposed surfaces which converge from the straight portion to the flattened end section, said smoothly tapered transition zone being disposed between said straight portion and said flattened end section, each said straight portion, each said smoothly tapered transition zone and each said flattened end section being coaxially aligned along a single straight line axis, each of said flattened end sections including opposed parallel surfaces and having a rectangular cross section and including a pair of wide parallel surfaces merging with the converging surfaces forming the transition zone and a pair of narrow parallel surfaoes merging with the diverging surfaces forming the transition zone, said pair of wide parallel surfaces being disposed in perpendicular relation to the plane of the middle portion, bent portion and



straight portion of the bracket, a mounting tab extending transversely of each flattened end section, rivet means securing the mounting tabs to said flattened end sections, said rivet means including spaced rivets to connect the tab to the flattened end section at spaced points to rigidly mount the tabs, each of said tabs including an aperture on opposite sides of the flattened end section to receive fastening means to mount the tabs on said vertical support surface with the bracket disposed horizontally and said converging surfaces forming the transition zone, the pair of wide surfaces forming the flattened end section and the tabs being disposed vertically, said smoothly tapered transition zone forming a stress diffusion zone in which torsional stress causes the transition zone and flattened sections to deform downward before the torsional shear load limit is reached within the transition zone and flattened end sections, said downward deformation of the horizontal bracket reducing the moment arm of torsion transmitted to said transition zone, the aluminum rod forming the bracket being metallurgically altered by a combination of cold work hardening and alignment of the grain of the aluminum rod at the transition zone followed by heat treating to increase deformation and break strength by increasing the temper state of the aluminum rod.

4,881,711

FULL FORMAT VARIABLE WIDTH FILM HOLD-DOWN DEVICE

Joseph F. Vollaro, Pleasantville, N.Y., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Mar. 21, 1988, Ser. No. 170,472
Int. Cl.[4] G03B 27/60
U.S. Cl. 248—362 **6 Claims**

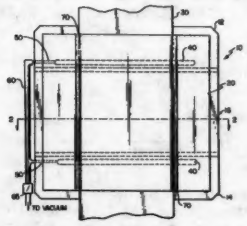
1. A variable width film hold-down device comprising:

a platen;

said platen having a pair of substantially parallel slits therein;

a section of elongated film traversing said pair of substantially parallel slits, the width of said elongated film being less than the length of one of said substantially parallel slits;

a transparent flexible cover sheet covering said pair of slits and said section of film so that a gap is formed at each



edge along the length of film and the surface of said platen which opens to the environment; and

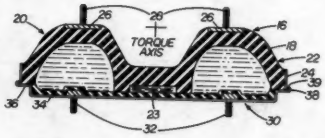
vacuum means for applying a vacuum to said pair of slits.

4,881,712

HYDRAULIC MOUNT

Saiman Lun, Englewood, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 21, 1988, Ser. No. 209,394
Int. Cl.[4] F16M 7/00
U.S. Cl. 248—562 **4 Claims**



1. A self contained hydraulic mount assembly for torsional damping of a vehicle engine or the like on the frame of the vehicle, said engine having a torsion axis, comprising:

first and second mounting members;

said first member being connected to said engine and the second member to the frame of the vehicle;

a singular elongated elastomeric body including first and second longitudinally aligned spaced, integral, flexible engine mounts, each of said engine mount connected to a first and second mounting members;

each said engine mount having a chamber defined in part by said elastomeric body;

said engine mounts including their respective said chambers located adjacent to and with said first mount on one side and said second mount on the opposite side of said torsion axis;

an integral orifice track in said body for providing restricted hydraulic fluid flow between said chambers;

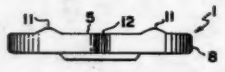
whereby upon operation of said engine said first and second engine mounts are compressed and expanded to effect forced exchange of hydraulic fluid along said orifice track between said chambers to provide damping of the vibration and the torsional motion of the engine, thereby providing isolation from the frame.

4,881,713

PREFORMED PATTERN FOR PRODUCING OCCLUSAL SPLINTS

Thomas B. Wise, 2568 Cheyenne Pl., Saginaw, Mich. 48603

Filed May 22, 1988, Ser. No. 197,516
Int. Cl.[4] A61C *9/00*
U.S. Cl. 249—54 **10 Claims**



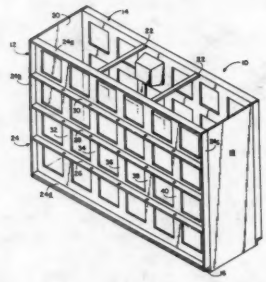
1. A preformed pattern for use in the production of a dental splint, said pattern comprising a generally U-shaped trough member formed of material that is form-stable at room temperature but flowable at elevated temperatures, said member having a pair of limbs converging in a direction toward one end of said member and being joined to one another by an arcuate bight, said member having a relatively flat base from one side of which spaced apart inner and outer side walls extend in the same direction, the opposite side of said member having a surface that is substantially flat except for a pair of upstanding protrusions spaced from one another along the arc of said bight, each of said protrusions having its maximum height at a point substantially co-planar with one of said side walls and declining smoothly from said point toward said surface.

4,881,714

CONCRETE MOLDING SYSTEM WITH TUBS

Bruce G. Koppenberg, 9674 Mt. Baker Hwy., Deming, Wash. 98244

Filed Jul. 5, 1988, Ser. No. 215,268
Int. Cl.[4] B28B *7/16*; E04H *13/00*
U.S. Cl. 249—60 **2 Claims**



1. Concrete molding apparatus comprising:

an integral lattice frame including a first set of multiple elongate expanses paralleling and laterally spaced from each other extending in one direction in the frame, and a second set of multiple elongate expanses parallelling and laterally spaced from each other extending transversely of said first set and joined therewith, said sets of expanses forming openings in said frame and said expanses having front sides collectively forming the front of the lattice frame and rear sides collectively forming the rear of the lattice frame,

a plurality of tub molds mounted in said frame, one mold in each respective one of said openings, the tub molds having a closed rear end, sides, and a front end and further including a perimeter rim extending about the front end, said molds being mounted with said rims against the front side of said expanses and said closed ends exposed rearwardly of the rear side of the frame,

an elongate retaining bar structure paralleling each expanse in one of said sets of expanses and disposed in front of the expanse associated therewith, the retaining bar structure bearing against mold perimeter rims disposed intermediate the bar structure and the expanse associated with the bar structure, and

plural detachable fasteners distributed along the length of each bar structure detachably fastening the bar structure to the expanse of the frame associated with the bar structure,

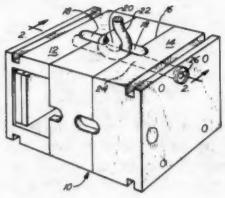
an elongate expanse in said one of said sets of expanses including a base web extending therealong and an elongate flange joined to and projecting from the base web, the rims of said molds lying against the base web and said detachable fasteners securing the retaining bar structure to said flange, the retaining bar structure being an elongate channel-shaped element with opposed shoulders defining a channel extending therealong and said bar structure being mounted with said shoulders straddling said flange.

4,881,715

SAFETY LIFT LOCK WITH INTERNAL MEMBER

John W. Von Holdt, 6864 Lexington La., Niles, Ill. 60648

Filed Dec. 30, 1988, Ser. No. 292,248
Int. Cl.[4] B29C *33/30*
U.S. Cl. 249—165 **10 Claims**



1. In a mold which comprises a pair of mating, openable and closable mold halves and a lock to hold the mold halves together while being lifted, the improvement comprising, in combination:

a recess defined in the outer surface of one of said mold halves; a lifting bridge crossing said recess and proportioned to permit a lifting hook to pass in the recess underneath said bridge to engage said bridge to lift the mold; an elongated member secured to the other of said mold halves, said member slide ably extending into said recess when the mold halves are substantially closed and substantially separated from said recess when the mold halves are open, said elongated member defining a longitudinal slot facing outwardly of said recess in said closed position to receive at least a portion of said lifting hook as the hook engages said bridge, said slot defining an end opposed to said other mold half which is closed to prevent a hook portion in the slot from sliding in the slot past said opposed end, whereby said mold in closed position cannot be opened while the lifting hook is present in said slot.

4,881,716

ASSEMBLY FOR PREFABRICATED FORMWORK

Gerhard Dingler, Schillerstrasse 49, 7274 Haiterbach, Fed. Rep. of Germany

Filed Oct. 11, 1988, Ser. No. 255,387
Int. Cl.[4] E04G *17/04*
U.S. Cl. 249—192 **22 Claims**

1. Assembly of two formwork panels and a plurality of locks for clamping the panels together which assembly has a plurality of clamping positions corresponding to the number of

formwork locks, each of said formwork panels having one formwork panel profile frame comprising

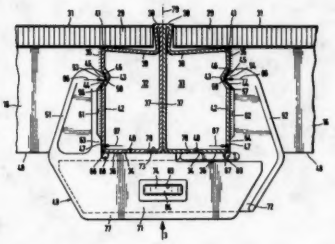
two mutually parallel longitudinal frame arms,

a plurality of stiff transverse members that are parallel to one another, are spaced approximately at equal intervals apart and have ends that are rigidly connected with said two mutually parallel frame arms, and

a formwork panel plate situated against and supported by front surfaces of said transverse members,

each of said frame arms having an outer transverse surface, an internal peripheral surface, a first sloping surface extending outwardly along said internal peripheral surface and facing towards said formwork panel plate, which sloping surface lies nearer to said formwork panel plate than to said outer transverse surface and is at a constant distance from said outer transverse surface, a first region possessing said outer transverse surface, a second region possessing an external bearing surface which is at least partly perpendicular to said formwork panel plate and bears against an external bearing surface of an adjacent formwork panel, a third region extending behind said formwork panel plate, and a fourth region possessing said first sloping surface and being spaced at a distance from said second region,

first regions on adjacent formwork panels being in alignment, said first and fourth regions each forming a corner having an external corner surface on said fourth region, and said frame arms being elastically compressible perpendicularly to said fourth region in a region of said first sloping surface,



each of said formwork locks comprising two claws, a yoke carrying said claws with an inner surface, and a wedge drive for each formwork lock that urges said two claws towards each other, said two claws having mutually-facing regions with second sloping surfaces that cooperate with said first sloping surfaces and press adjacent frame arms towards each other and towards said yoke, a flat bearing surface on said inner surface of said yoke, against which said outer transverse surfaces of said frame arms bear in aligning manner at least partially, and the improvement wherein:

(a) projections are provided on said mutually-facing regions adjacent to and contacting said corner surfaces, a free space being present between said projections and both said first and second sloping surfaces,

(b) said first sloping surfaces have positions thereon to which movement of said second sloping surfaces on said claws is limited,

(c) said projections always bear against said corner surfaces with a bearing force that is greater than opening forces on said profile frames that occur in operation, and

(d) with said projections bearing against said corner surfaces, said second sloping surfaces on said claws are still at a distance from said limiting positions on said first sloping surfaces on said fourth region, even after forces have been applied onto said wedge drive by hammer blows from building hammers and before permanent deformation of said first and fourth regions.

4,881,717

VACUUM CHAMBER

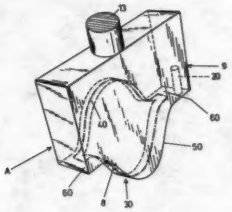
Friedrich Geiser, Nüziders, Austria, assignor to Siegried Schertler, Haag, Switzerland

Filed Jan. 23, 1989, Ser. No. 300,477

Claims priority, application Fed. Rep. of Germany, Jan. 23, 1988, 3801998

Int. Cl.[4] F16K *51/00*

U.S. Cl. 251—144 **9 Claims**



1. In a vacuum-tight chamber for use in vacuum plants, the chamber serving for treating or storing objects therein or for passing objects therethrough, the chamber being formed by walls, at least one of the walls having at least one opening for placing the objects in the chamber and removing the objects therefrom, the opening having an axis and a plane extending perpendicularly to the axis, a closing member for closing the opening, a sealing surface being provided within the chamber and laterally spaced from the opening, a circumferentially closed sealing member being arranged on the closing member, the sealing member resting against the sealing surface in the closed position of the closing member, the improvement comprising the sealing surface having imaginary straight generatrices which extend parallel to the axis of the opening of the chamber, the sealing surface having at least two sealing surface portions, the sealing surface portions being laterally offset from each other relative to the axis of the opening and leading into each other at opposite locations, the circumferentially closed sealing member being formed of one piece, the sealing member having sections including two principal sections of different lengths or shapes which are located in different planes, the two principal sections of the sealing member being located in planes which extend perpendicularly to the axis of the opening, the two principal sections being spaced apart from each other and being connected by lateral sections, the closing member having a surface carrying the circumferentially closed sealing member and corresponding in shape to the sealing surface, the closing member extending in a plane, the closing member being slidable in the wall of the chamber in the plane of the closing member and parallel to the plane of the opening.

4,881,718

BALL CONTROL VALVE

Raymond P. Champagne, Coventry, R.I., assignor to Jamesbury Corporation, Worchester, Mass.

Filed Nov. 27, 1987, Ser. No. 125,979

Int. Cl.[4] F16K *47/04, 5/06, 5/10*

U.S. Cl. 251—209 **1 Claim**

1. A precision fluid control ball valve comprising:

(a) a valve housing defining an inlet conduit, a ball chamber and an outlet conduit;

(b) an annular valve seat surrounding each of said inlet and outlet conduits;

(c) a spherical ball valve member mounted in said ball cham-

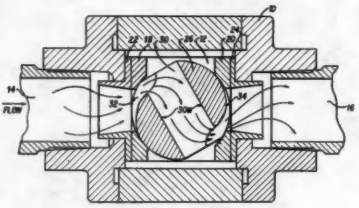
ber for rotation about an axis and in engagement with said valve seats;

(d) means for rotating said spherical ball valve member about said axis;

(e) said spherical ball valve member comprising:

(1) a ball port extending through said spherical ball valve member in a direction perpendicular to said axis and adapted to permit the flow of fluid from said inlet conduit to said outlet conduit when said spherical ball valve member is rotated about said axis to an open position;

(2) an elongated groove adjacent to and connected with each end of said ball port extending into the surface of said spherical ball valve member and extending partially



around the circumference of said spherical ball valve member in a common direction away from said port in the plane of rotation of said spherical ball valve member, said grooves having a selected depth and width at the point of intersection with said port thus providing a selected area for fluid flow through said grooves at said point and said area decreasing as said groove extends around said circumference away from said port, thus providing for a reduced area for fluid flow; and

a diffuser located in said outlet conduit, said diffuser lining said outlet conduit and diverging outwardly from said ball chamber wherein said diffuser is replaceable and is formed of a material harder than said valve housing.

4,881,719

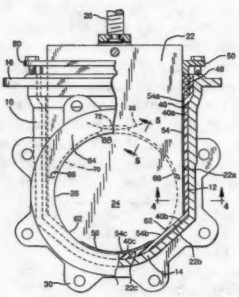
GATE VALVE

Jeffrey M. Bowman, 6920 SW. 2nd Ave., Portland, Oreg. 97219

Filed Sep. 23, 1988, Ser. No. 248,050

Int. Cl.[4] F16K *3/02*

U.S. Cl. 251—328 **8 Claims**



1. A gate valve for controlling the flow of fluid between a pair of pipes, comprising:

a body member having upper and lower portions,

an opening in the lower portion of said body member,

a gate having a bottom sealing edge,

gate operating means for said gate on the upper portion of said body member,

a plastic liner secured to said body member in said opening and having upper and lower and side defining portions forming a valve flow passage having opposite side portions,

a bottom seating surface on said liner engageable by said gate and having a center portion with upwardly and outwardly extending side portions,

and wall means defining a top opening, downwardly extending recess in said liner receiving said gate in a slidable surface sealing fit,

said recess and gate being wider than said flow passage and the wall means of said recess terminating at a bottom portion of said flow passage above the center portion and adjacent the upwardly disposed side portions of said seating surface to provide side sealing and pressure backing support for said gate from the bottom of said wall means and upwardly of the gate.

4,881,720

HAND OPERATED CHAIN BLOCK

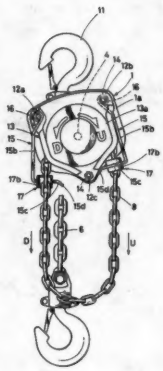
Yosaku Nishimura, Osaka, Japan, assignor to Vital Kogyo Kabushiki Kaisha, Osaka, Japan and Ingersoll-Rand Company, Phillipsburg, N.J.

Filed Aug. 24, 1988, Ser. No. 236,031

Claims priority, application Japan, Feb. 29, 1988, 63-26556[U]

Int. Cl.[4] B66D *3/16*

U.S. Cl. 254—358 **3 Claims**



1. In a hand-operated chain block comprising a load sheave rotatably supported by and between a pair of side plates and a hand chain wheel mechanically coupled to said load sheave and positioned on the side of one of said side plates facing away from said load sheave, the improvement comprising an enclosure for covering substantially the entire periphery of said hand chain wheel, said enclosure including:

a plurality of stays mounted on said side of said one of said side plates about said hand chain wheel, two of said stays lying above the axis of rotation of said hand chain wheel when said hand-operated chain block is suspended from above;

a hand chain wheel cover having a leftwardly laid-down U-shaped sectional configuration, said hand chain wheel cover mounted on said plurality of stays so as to cover upper, lower, and front portions of said hand chain wheel,

a pair of hand chain guide plates, each said hand chain guide plates mounted on one of said two of said plurality of stays as to cover side portions of said hand chain wheel, each of said hand chain guide plates being formed of one metal plate in a folded pattern, with a pivotal support portion formed at an upper end portion thereof in a crooked pattern and with a cylindrical hand chain guide portion

formed at a lower end portion thereof, said two stays extending through said pivotal support portions, said hand chain guide plates being suspendingly pivotally supported by said stays, and

a hand chain wound around said hand chain wheel, said hand chain being inserted through said hand chain guide portions for being guided by said hand chain guide portions.

4,881,721

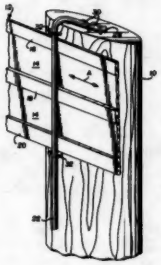
FENCE POST AND WEB CONNECTION SYSTEM

Jack Manley, Leighton, Ala., assignor to Edward S. Robbins, III, Florence, Ala.

Filed Nov. 6, 1987, Ser. No. 117,496

Int. Cl.[4] B21F *27/00*

U.S. Cl. 256—52 **26 Claims**



25. In a fencing system comprising a plurality of fence posts and at least one elongated web extending between and substantially perpendicular to said plurality of fence posts, an improved connector system for attaching said web to each of said posts such that said web is free to move axially in the direction of elongation of the web, said connector system comprising, for each post, at least one elongated strand extending along the post and over said web, said at least one strand comprising at least one plastic-coated high tensile strength member, said strand firmly secured at either end to said post; and at least one pair of fasteners associated with each of said at least one web, said fasteners holding said strand against said post at locations adjacent upper and lower edges of said web, such that said web is free to move horizontally in the direction of elongation of the web.

4,881,722

APPARATUS FOR PRODUCING SUPERFINE PARTICLE

Tadashi Koizumi, Tokyo; Seiji Yokota, Kanagawa; Shigeo Matsumura, and Yoshiaki Inoue, both of Tokyo, all of Japan, assignors to Neturen Company Limited, Tokyo, Japan

Continuation of Ser. No. 143,644, Jan. 13, 1988, abandoned. This application Apr. 11, 1989, Ser. No. 336,560

Claims priority, application Japan, Jan. 27, 1987, 62-9300[U]

Int. Cl.[4] B22F *9/14*

U.S. Cl. 266—176 **5 Claims**

1. An apparatus for producing superfine particles of inorganic substances which comprises:

a substantially airtight outer vessel,

an enclosed inner vessel disposed within said outer vessel, the outer surface of said inner vessel being in proximity to the inner surface of said outer vessel,

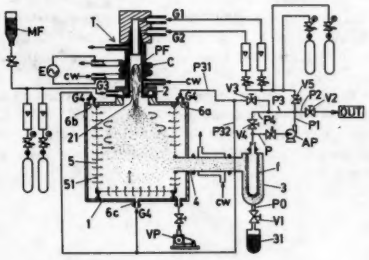
a means to form superfine particles from inorganic materials disposed within said inner vessel,

a vacuum means outside said outer vessel connected by a conduit passing through said outer vessel to the inner surface of said inner vessel, and

a collecting means connected to said vacuum means for collecting said superfine particles,

said inner vessel having a plurality of pores extending from the outer surface to the inner surface thereof, to permit the flow of an atmospheric gas for collection of resulting superfine particles therethrough,

said inner vessel further having an inlet for the introduction of inorganic materials capable of forming superfine particles,



said outer vessel having at least one inlet for the introduction of said gas in said inner vessel flowing through said pores,

whereby substantially all superfine particles formed in said inner vessel are removed by suction created by said vacuum means in a stream of gas entering said outer vessel and flowing through said pores of said inner vessel for collection by said collecting means.

4,881,723

DOUBLE-DAMPED GAS SPRING WITH FRICTION LINER AND SEALING RING

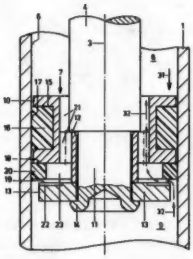
Hans J. Bauer; Hans-Peter Bauer, and Ludwig Stadelmann, all of Altdorf, Fed. Rep. of Germany, assignors to Fritz Bauer + Sohne oHG, Altdorf, Fed. Rep. of Germany

Filed Apr. 8, 1988, Ser. No. 179,502

Claims priority, application Fed. Rep. of Germany, Aug. 3, 1985, 3527997

Int. Cl.[4] F16F *5/00, 9/36, 11/00*

U.S. Cl. 267—64.12 **10 Claims**



1. A gas spring, comprising a substantially cylindrical housing tightly closed at one end and a piston rod disposed concentrically in the housing and extending out of said housing in a sealed manner at the other end of said housing, the piston rod being provided on its end located in the housing with a piston assembly fixed thereto, said piston assembly comprising a sealing ring forming part of a valve means resting on the inner wall of the housing and being guided in a damped manner, wherein

the piston assembly has a friction damping liner resting against the inner wall of said housing, and

pneumatic damping means for pneumatically damping said

piston assembly, said pneumatic damping means including at least one gas passage channel extending through said piston assembly and the valve means for restricting said channel as said piston assembly moves in a first direction in said housing and for opening said channel as said piston assembly moves in a direction opposite said first direction in said housing;

said piston assembly including a holding means for retaining said friction damping liner in said piston assembly and against said inner wall of said housing, said holding means further defining at least a portion of the length of said channel;

said friction damping liner comprising an expanded plastic band of foamed polyurethane impregnated with lubricant and constituting means for producing a damping force of between 30 and 120N in addition to said pneumatic damping.

4,881,724

FLEXIBLE MOUNTING FOR ENGINES, MACHINE ASSEMBLIES AND THE LIKE

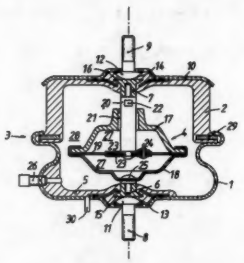
Paul Bausch, Hattenheim, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 27, 1988, Ser. No. 211,632

Claims priority, application Fed. Rep. of Germany, Aug. 7, 1987, 3726314

Int. Cl.[4] F16F *15/04, 9/04;* B62D *21/00*

U.S. Cl. 267—64.23 **3 Claims**



1. Flexible mounting for machine assemblies comprising a pair of mounting members (1,10), an elastomeric body (2) connecting said mounting members and cooperating therewith to define a first chamber (28), damper means (4) mounted within said first chamber, said damper means comprising a housing (17,18) fixed to one of said mounting members (1), a diaphragm (19) separating the interior of said damper housing into a pair of damper chambers (27), a damper bore (24) connecting said damping chambers, a plunger (20) guided in said damper housing and fixed at one end to said diaphragm and at another end to the other of said mounting members (10), a gas passage between one of said damper chambers (27) and said first chamber (28), and all of said chambers charged with pressurized gas so that upon vibration of one mounting member relative to the other, gas flow is forced through said damper bore and said gas passage and steadily seeks to equalize the pressure in said chambers and wherein peak pressures in said damper chambers occur with a phase shift.

4,881,725

ACCUMULATOR PISTON HAVING A COIL SPRING SECURED THERETO

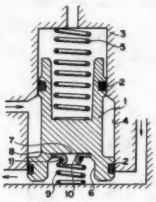
Yasuhiro Shioda, Toyota; Shinya Nakamura, Owariashahi; Makoto Funahashi, and Seitoku Kubo, both of Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Feb. 17, 1988, Ser. No. 156,575

Claims priority, application Japan, Feb. 23, 1987, 62-39901

Int. Cl.[4] F16F *1/12;* F01B *31/00;* F16L *55/04*

U.S. Cl. 267—179 **12 Claims**



7. An accumulator comprising: a cylinder; a piston fitted in said cylinder in a manner to move in response to a hydraulic pressure; and a sealing element for sealing up the outer circumference of said piston and the inner circumference of said cylinder,

wherein the improvement comprises:

a spring for urging said piston in a first one of the moving directions of said piston;

a bottomed cylindrical hollow portion formed in the end of said piston toward said first moving direction; and

a plate secured to the bottom of said hollow portion by caulking on the inner wall of said hollow portion near said bottom, said spring being secured to said piston through said plate.

4,881,726

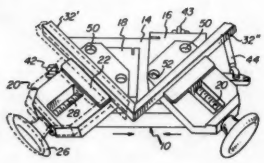
VISE FOR JOINING FRAMES

Robert M. Jolkovski, 34 Hamilton Rd., Arlington, Mass. 02174

Filed Mar. 31, 1988, Ser. No. 175,843

Int. Cl.[4] B25B *1/20*

U.S. Cl. 269—41 **10 Claims**



1. A vise for joining frame pieces having complementary end faces, comprising:

a base having an upper surface;

a first clamp assembly including a first plate slidabiy mounted on said base upper surface, said first plate and said base having cooperating means for constraining said first plate to movement laterally with respect to said base along a path on a first rectilinear axis and in a single plane, and a first body supported on said first plate and having means for clamping a frame piece thereon;

a second clamp assembly including a second plate slidably mounted on said base upper surface, said second plate and said base having cooperating means for constraining said second plate to movement transversely with respect to said base along a path on a second rectilinear axis perpendicular to said first axis and in a single plane, and a second

body supported on said second plate laterally adjacent said first body, said second body having means for clamping a frame piece thereon to dispose it in a common plane with a frame piece clamped on said first body;

first screw means operatively connected to said first plate for finely adjusting the position of said first clamp assembly along said path on said first axis, and for fixing it thereat; and

second screw means operatively connected to said second plate for finely adjusting the position of said second clamp assembly along said path on said second axis, independently of the adjustment of said first clamp assembly by said first screw means, and for fixing it thereat, whereby frame pieces clamped on said bodies can be brought into and maintained in mutual contact in at least one accurate angular relationship to one another.

4,881,727

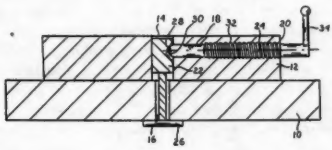
CLAMPING MECHANISM

Robert Nemirovsky, 1117 Hyman Ave., Bay Shore, N.Y. 11706, assignor to Joseph Deutsch and Robert Nemirovsky, both of Bay Shore, N.Y.

Continuation-in-part of Ser. No. 82,307, Aug. 6, 1987, Pat. No. 4,784,064. This application Jun. 24, 1988, Ser. No. 211,478

Int. Cl.[4] B23Q *3/02*

U.S. Cl. 269—309 **11 Claims**



1. A clamping mechanism for clamping a first and a second member, said members having corresponding first and second openings, respectively, said second member having a longitudinal channel transversal to said first opening, comprising:

a shaft disposed in said aligned openings, said shaft having engaging means for engaging said first member, and a shaft concave surface facing said longitudinal channel;

actuating means reciprocatingly disposed in said longitudinal channel, said actuating member terminating in a convex surface facing said concave surface;

said shaft and said actuating means cooperating to urge said shaft in a first direction to clamp said members when said actuating means is moved toward said shaft by engagement of said curved surfaces to generate an axial force on said shaft;

said shaft and actuating means cooperating to release said members when said actuating means is moved away from said shaft; and

returning means for urging said shaft in a second direction opposite said first direction.

4,881,728

ADJUSTABLE HEAD SUPPORT ATTACHMENT FOR THERAPY TABLE

Lemna J. Hunter, 2005 MacKinnon Ave., Cardiff, Calif. 92007

Filed Sep. 6, 1988, Ser. No. 240,622

Int. Cl.[4] A47C *7/38*

U.S. Cl. 269—328 **11 Claims**

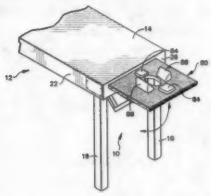
1. An adjustable head support for a therapy table, comprising:

an elongated telescoping shaft having means one each end thereof for attachment to opposite side rails of tables of different width;

a pair of arms each rotatably mounted at an inner end at spaced positions along said shaft;

a head support member mounted on an outer end of said arms;

a one-way brake on one of said arms for stopping rotation thereof relative to said shaft in one direction, said brake comprises a hub rotatably supporting said arm on said



shaft, and an eccentric cam mounted on said hub and biased into engagement with said shaft; and

brake release means for selectively releasing said brake for enabling rotation in said one direction, said brake release means comprises an elongated cable connected at one end to said eccentric cam and a handle connected at the other to said cable and positioned beneath said head support member.

4,881,729

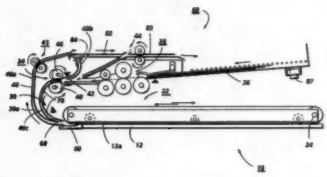
RECIRCULATING DOCUMENT HANDLER WITH INTEGRAL SADH

Robert L. Culligan, West Henrietta Road, and George J. Roller, Penfield, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 202,348, Jun. 6, 1988. This application Nov. 28, 1988, Ser. No. 276,849

Int. Cl.[4] B65H *5/26*

U.S. Cl. 271—3.1 **6 Claims**



1. In a document handler for feeding documents to be copied at a copier imaging station, with a document stacking tray overlying the imaging station and accessible from the upper surface of said document handler:

a recirculating document handling system for sequentially feeding and recirculating a set of documents from and back to one side of said document stacking tray in a document recirculation path;

said document recirculation path including a document feeding path portion from said document stacking tray to an adjacent side of said imaging station;

said document recirculation path also including a document restacking return path portion for returning documents back from said same side of the imaging station to said same side of said document stacking tray;

a semi-automatic document feeding system integral said recirculating document handler for sequentially feeding individual document sheets to said copier imaging station in a semi-automatic document feeding path;

said semi-automatic document feeding path having a document inserting entry separate from said document stacking

tray but adjacent thereto and also accessible from the upper surface of said document handler;

said semi-automatic document feeding path extending downwardly from said document inserting entry thereof to said document feeding path portion of said document recirculation path by intersecting and extending through said document restacking return path;

said semi-automatic document feeding path merging into and commonly utilizing said document feeding path portion of said document recirculation path to feed documents from said document inserting entry to said imaging station for copying.

4,881,730

SORTER

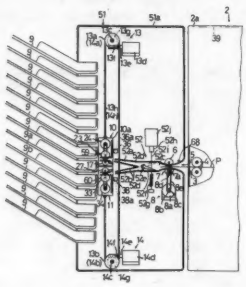
Tamaki Kaneko, Fujisawa, Japan, assignor to O/A Technologies, Inc., Irvine, Calif.

Continuation of Ser. No. 3,146, Jan. 14, 1987, abandoned. This application Feb. 16, 1988, Ser. No. 159,497

Claims priority, application Japan, Jan. 20, 1986, 61-008007; Jan. 21, 1986, 61-008981; Oct. 20, 1986, 61-247457

Int. Cl.[4] B65H *3/10*

U.S. Cl. 271—296 **12 Claims**



1. A sorter having a bank of receptacles vertically disposed at given intervals to sort sheets discharged from a sheet handling machine onto said receptacles, comprising:

a plurality of lift members disposed close to said bank of receptacles and movable up and down,

lift driving means for respectively raising and lowering said respective lift members from a wait position at which sheets are received,

sheet pinching means respectively disposed at said respective lift members to momentarily hold a sheet being transferred,

sheet discharge means respectively disposed at said respective lift members to discharge sheets toward receptacles,

means for discharging sheets from said sheet handling machine so that said discharge sheet is held by said sheet pinching means on one of said lift members positioned at said wait position,

means for transporting said one of lift members to a target position while said sheet pinching means holds the sheet, and

means for controlling said sheet discharge means to discharge the sheet toward the target receptacle.

4,881,731

SHEET FEEDING APPARATUS

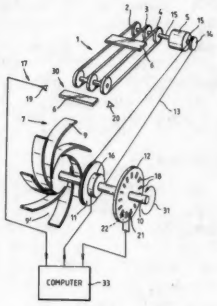
Raymond Simpson-Davis, Hampshire, England, assignor to De La Rue Systems, Ltd., England

Filed Sep. 13, 1988, Ser. No. 243,683

Claims priority, application United Kingdom, Sep. 16, 1987, 8721744

Int. Cl.[4] B65H *29/40*

U.S. Cl. 271—315 **5 Claims**



1. Sheet feeding apparatus comprising a feed system for feeding sheets, and a sheet stacking system to which said sheets are fed by said feed system, said sheet stacking system including a rotatable stacking wheel having a plurality of sheet receiving slots into which said sheets are fed by said sheet feed system, rotation of said stacking wheel carrying sheets from a sheet receiving position to a sheet stacking position, said sheet stacking system including means actuable to stop the rotation of said sheet stacking system to enable at least the leading end of a sheet to be fed into a sheet receiving slot of said stacking wheel, drive means to rotate said stacking wheel, and a clutch connecting said drive means to said stacking wheel to enable said drive means to continue rotating when said stacking wheel is stopped, wherein said clutch comprises a drive belt entrained around first and second pulley wheels, said first pulley wheel being driven by said drive means and said second pulley wheel being connected to said sheet stacking wheel, said drive belt being adapted to slip around one or both of said pulley wheels when the rotation of said stacking wheel is stopped.

4,881,732

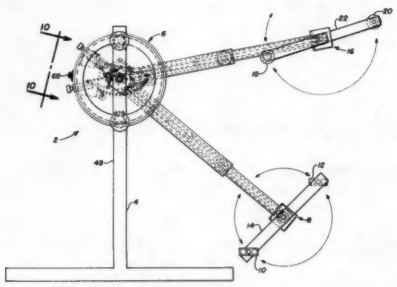
EXERCISE DEVICE

Joseph Kepiro, 810 Waterfront Dr., Lancaster, Pa. 17602

Filed Feb. 22, 1988, Ser. No. 158,649

Int. Cl.[4] A63B *21/00*

U.S. Cl. 272—73 **2 Claims**



1. An exercise device comprising:

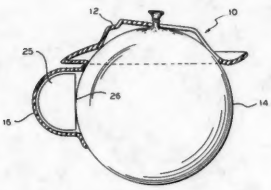
(a) a frame means for supporting the structure that will be used for exercising the muscles of the arms and legs;
(b) a first pedal means adapted to be driven by the legs of one using the exercise device;
(c) a second pedal means adapted to be driven by the arms of one using the exercise device;
(d) both said first and second pedal means being mounted on the frame means;
(e) means interconnecting said first pedal means and said second pedal means so that a force applied to one pedal means will assist in the movement of the other pedal means;
(f) said means interconnecting said pedal means is within the perimeter surface and ends of a drum supported on the frame means, said first and second pedal means each being on the end of their individual support structures extending from the drum, means transmitting the rotating motion of each pedal means to the rotating motion of bevel gears on a common axle, one bevel gear for each pedal means, within the perimeter surface and ends of said drum;
(g) clutch means on said common axle selectively engaging none, one or both of the bevel gears of the two pedal means whereby when the clutch means engage said gears, the force applied to either of the pedal means is transmitted to the other pedal means; and
(h) said clutch means is composed of two clutch structures keyed to the common axle and slidable therealong, means moving each clutch structure selectively into and out of engagement with each of said bevel gears for each pedal means.

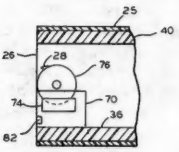
4,881,733

BALLOON POPPING MECHANISM

Steven Rehkemper, and Denni Rivette, both of Chicago, Ill., assignors to C&S Distributing Co., Santa Monica, Calif.

Filed Mar. 14, 1988, Ser. No. 167,575
Int. Cl.[4] A63F 9/00
U.S. Cl. 273—1 R **7 Claims**





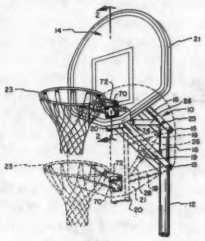
1. A toy comprising:
holder means for retaining an expandable article;
a wheel retained by said holder so that the periphery of said wheel is in close proximity to said expandable article;
puncturing means fixed to the periphery of said wheel; and
means for rotating said wheel through a variable distance, so that when said puncturing means rotates sufficiently it contacts said expandable article and causes it to burst.

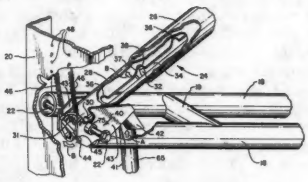
4,881,734

METHOD AND APPARATUS FOR ADJUSTING A BASKETBALL GOAL

Stephen F. Nye, Roy, Utah, assignor to Lifetime Products, Inc., Salt Lake City, Utah

Continuation of Ser. No. 922,041, Oct. 21, 1986, Pat. No. 4,781,375. This application Jun. 16, 1988, Ser. No. 207,708
The portion of the term of this patent subsequent to Nov. 1, 2005, has been disclaimed.
Int. Cl.[4] A63B 63/08
U.S. Cl. 273—1.5 R **36 Claims**





15. An adjustable basketball goal system for adjustment of the height of a basketball goal above a playing surface, comprising:
a deformable parallelogrammatic structure;
means for securing the basketball goal to said parallelogrammatic structure;
means for securing said parallelogrammatic structure to a rigid vertical support such that said parallelogrammatic structure is suspended above the playing surface;
a telescoping support, said telescoping support being slidable a maximum distance between a retracted configuration and an extended configuration and disposed substantially as a diagonal for said parallelogrammatic structure wherein said telescoping support has two ends, each of which is pivotally connected to said parallelogrammatic structure, comprising:
a first cylindrical member having a longitudinal slot with a plurality of notches;
a second cylindrical member slidably connected to said first cylindrical member and having a post disposed within said slot, wherein said post slides along the length of said slot as said first cylindrical member slides with respect to said second cylindrical member and said post may engage one of said notches to restrict further movement of said first and second cylindrical members with respect to each other;
a lever plate configured to receive the end of an elongated implement and to restrain the end of the implement from inadvertent slippage as the implement is used to apply a force to said lever plate, said lever plate being further configured such that when a sufficient force is applied to said lever plate, said lever plate supports the effective weight of the goal and causes one of the cylin-

drical members to rotate about its longitudinal axis such that said post is disengaged from one of said notches and is disposed for slidable movement along the length of said slot thereby allowing said telescoping support to extend and contract its length; and

means for restricting the sliding movement of said first and second cylindrical members when one of the cylindrical members is rotated and released such that the inadvertent momentary actuation of said rotator means results in the cylindrical members sliding substantially less than said maximum distance.

25. A method for adjusting the height of a basketball goal secured to a deformable parallelogrammatic structure, the deformable parallelogrammatic structure being secured to a rigid support and being restricted against deformation by restricting means, the restricting means being biased by a biasing means in an engaged position, the restricting means being configured such that it will move from the engaged position to a disengaged position upon actuation of a releasing means, the releasing means configured to receive the end of a force applying implement and to restrain the end of the implement from inadvertent slippage as the implement is used to apply a force to the releasing means, the releasing means further configured such that when a sufficient force is applied to the releasing means, the releasing means supports the effective weight of the goal and causes the restricting means to move from the engaged position to the disengaged position, the method comprising the steps of:

applying a force to the releasing mans such that the effective weight of the goal is supported and such that the restricting means moves from an engaged position to a disengaged position;

changing the height of the basketball goal thereby changing the shape of the parallelogrammatic structure from a first configuration to a second configuration; and

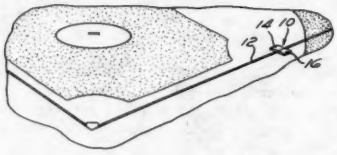
removing the force from the releasing means thereby allowing the restricting means to return under the biasing force to the engaged position thereby restricting further deformation of the parallelogrammatic structure.

4,881,735

SAFTEY BASE

Louis A. Orsatti, Laguna Hills, Calif., assignor to Adams, U.S.A., Inc., Cookeville, Tenn.

Filed Jun. 17, 1988, Ser. No. 208,244
Int. Cl.[4] A63B *71/02*
U.S. Cl. 273—25 **7 Claims**



1. A double-width base pad comprising:

first and second single-width base pad members, each having a pliable outer skin defining a generally horizontal upper surface and a plurality of lateral edges and a resilient inner core positioned within said pliable outer skin; and

a means for connecting the first single-width base pad member to the second single-width base pad member such that one lateral edge of the first single-width base pad member abuts one lateral edge of the second single-width base pad member, thereby forming the desired double-width base pad;

wherein said means for connecting the first single-width base pad member to the second single-width base pad member comprises:

a first elongate bar positioned inside the pliable outer skin and along a selected lateral edge of the first single-width base pad member;

a second elongate bar positioned inside the pliable outer skin and along a selected lateral edge of the second single-width base pad member;

a plurality of individually alignable apertures extending through said first and second elongate bars and the respective selected lateral edges of the first and second single-width base members; and

a plurality of connecting members passing through said alignable apertures so as to connect the first single-width base pad member to the second single-width base pad member such that the respective selected lateral edges thereof will be held in abutment with one another, thereby forming the desired double-width base member.

4,881,736

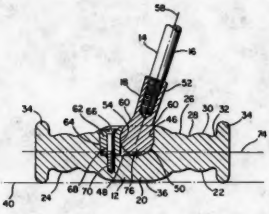
BAT HANDLE FOR PLASTIC BEVERAGE BOTTLE

Daniel W. Fox, 202 East Sharon, Phoenix, Ariz. 85022

Filed Sep. 7, 1983, Ser. No. 530,090
Int. Cl.[4] A63B *59/00*
U.S. Cl. 273—26 B **6 Claims**

1. A bat handle for attachment to the screw threaded neck of a plastic container such as a plastic beverage bottle comprising an elongated member constructed in a manner to simulate the handle of a ball bat, said member including an internally threaded socket on one end thereof for screw threaded attachment to the neck of a container with the container adapted to form an extension of the elongated member and the combination of the elongated member and container adapted to form a bat by which a ball may be struck, said elongated member being an elongated tubular plastic member with the internally threaded socket being of one-piece unitary construction therewith, said elongated tubular member including a peripheral knob at the end thereof remote from the internally threaded socket to prevent the bat handle from slipping out of the hands of a user when a combined bat handle and container are swung in a manner to bat a ball, said knob end of the elongated member being provided with a concave end surface to supportingly engage a portion of the periphery of a ball thereby enabling a combined bat handle and container to serve as a batting tee for supporting a ball in elevated position for engagement by another bat.

4,881,737
TRUE ROLL PUTTER
Billy J. Mullins, 2009 11th St., Wichita Falls, Tex. 76301
Filed Feb. 9, 1989, Ser. No. 307,926
Int. Cl.[4] A63B *53/02, 53/04*
U.S. Cl. 273—80 A **18 Claims**



1. A golf putter including a horizontally elongated, generally cylindrical head including opposite ends, an elongated upstanding handle having upper and lower ends, mounting means mounting said lower end from said head centrally intermediate said opposite ends and with said handle inclined relative to the vertical toward one end of said head, said head including a substantially cylindrical central portion and cylindrical opposite end portions, said opposite end portions including alternating longitudinally spaced zones of large and small diameter cross section with the terminal ends of said end portions comprising large diameter zones of said end portions and the last mentioned large diameter zones convexly rounded in directions extending longitudinally of said head, said central portion and end portions being coaxial, the undersurfaces of said terminal ends lying in a horizontal plane above which the undersurface of said central portion is spaced.

4,881,738
MANIPULATIVE AMUSEMENT DEVICE
David B. Ayers, 13908 Craveuridge Dr., Houston, Tex. 77083
Filed Jan. 11, 1989, Ser. No. 295,819
Int. Cl.[4] A63F *9/08*
U.S. Cl. 273—153 S **11 Claims**

1. In a manipulative amusement device including an upper plate and lower plate parallel to and in coaxial alignment with the upper plate and rotatable relative to said upper plate, each plate having a common center-point and including a plurality of openings on the outer periphery thereof alignable in vertical registry upon relative rotation, each plate further including a pair of spaced collar pieces disposed on opposite sides of of each of said plurality of openings which when said plate openings are in vertical registry mating pairs of said collar pieces define a plurality of coaxially disposed spaced pairs of collar members each having a pair of coaxially aligned recesses, a plurality of cylinder assemblies each formed about a respective longitudinal axis and comprised of an even number of cylinder segments numbering at least six, and each said cylinder assembly having opposing annular end projections for being rotatably received by each said pair of annular recesses in one of said pair of spaced coaxially aligned collar members and in coaxial alignment therewith for permitting rotation of each of said cylinder assemblies about said axis of one of said pairs of collar members the improvement in combination therewith, comprising

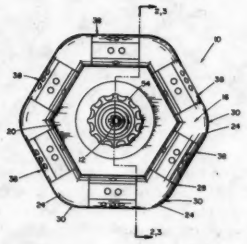
a knob portion having an inner generally cylindrical recess projecting axially outwardly from said upper plate, said upper plate further having a central aperture disposed axially thereof and coaxially aligned within in said generally cylindrical knob portion,

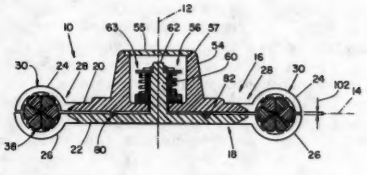
said lower plate having an axial post projecting outwardly from the inner face thereof for registering with and projecting through said upper plate central aperture and coaxially into said knob portion generally cylindrical recess,

force exerting means cooperating with said lower plate projecting post and the interior of said upper plate knob portion generally cylindrical recess for securing said upper plate to said lower plate in rotational relationship thereto and biasing said upper plate into radial contact with said lower plate for forming said pairs of cylinder members, said force exerting means permitting limited axial separation of said upper and lower plates in response to outward forces exerted therebetween,

each of said collar members having disposed within said annular recesses a plurality of circumferentially-spaced longitudinally disposed projecting lugs, and

each of said cylinder assembly annular end projections having a plurality of circumferentially-spaced longitudinally disposed recesses registering with said plurality of collar member circumferentially-spaced projecting lugs,





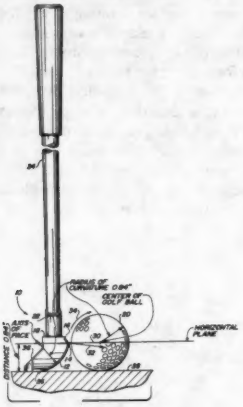
wherein when said circumferentially-spaced lugs and recesses are in registry said force exerting means biases said upper plate into contact with said lower plate and one half of said cylinder segments comprising each said cylinder assembly is axially aligned within each of said pairs of spaced collar pieces for permitting planar rotation of said upper and lower plates and said circumferential displacement of said one half of said cylinder segments from one plate opening to an adjacent plate opening,

wherein when said circumferentially-spaced lugs and recesses are out of registry said lugs ride out of said recesses and contact the circumferential surface of said annular end projections to produce an outward force acting between said upper and lower plates against said force exerting means for permitting limited axial separation between said vertically registering collar pieces and said pair of plates for facilitating axial rotation of each said cylinder assembly.

4,881,739
GOLF PUTTER

Larry Garcia, 160 Ashley La., Oldsmar, Fla. 34677

Filed Nov. 16, 1987, Ser. No. 121,749
Int. Cl.[4] A63B *53/04*
U.S. Cl. 273—164 1 Claim



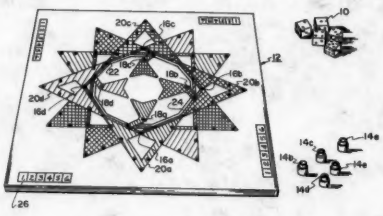
1. A golf putter comprising in combination:
a shaft;
a grip located on the upper end of the shaft;
an elongated putter head having a heel area and a toe area; the putter head being formed with a top portion including means for coupling the head to the shaft, a centrally located bottom portion constituting a sole for positioning the putter head in a ball-striking orientation on a putting green, a quarter right circular cylinder ball-striking face located therebetween and terminating at its lower end in the bottom portion and at its upper end in a horizontal edge parallel to said flat sole and adjacent to the top portion, and an upwardly and rearwardly beveled generally rectangular area between the horizontal edge and the top portion, the ball-striking face being arcuate in its cross-sectional shape with a 0.84 inches radius of curvature and curved about an axis located in a first horizontal plane above the sole, the first horizontal plane including the axis, the center of a golf ball to be struck, and the striking point of the ball-striking face, the vertical distance between the first horizontal plane and a second horizontal plane comprising the sole and the bottom of the golf ball to be struck being 0.84 inches.

4,881,740
BOARD GAME METHOD OF PLAY

Hugo V. Odhner, P.O. Box 185, Bryn Athyn, Pa. 19009

Filed Oct. 26, 1987, Ser. No. 112,288
Int. Cl.[4] A63F *3/00*
U.S. Cl. 273—248 7 Claims

1. A method of playing a board game with at least one player playing in turn on a playing board having at least one path, said path having a predetermined number of spaces and a defined start and finish, which method comprises
providing at least one die, each die having multiplied numbered faces, the total number of dice being at least one less than the total number of faces on any die;
rolling the dice to provide a randomly selected number on each die;
wherein a tallying means is provided which comprises a series of numbers, each corresponding to a different number on each of the faces of a die, and
scoring is accomplished by eliminating each number on the tallying means with a corresponding number selected on a die and summing any numbers not eliminated;
each player provided with multiple playing pieces and moving at least one playing piece along a path, progression

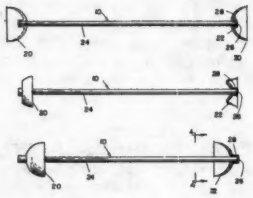


through the spaces determined by the dice score each turn;
determining a winner by the player who progresses each of its playing pieces from the start to the finish.

4,881,741
JUGGLING SYSTEM FOR AMUSEMENT, EXERCISING AND TRAINING

James R. Shapiro, 10 Malibu Ct., Towson, Md. 21204

Filed Dec. 29, 1988, Ser. No. 291,657
Int. Cl.[4] A63B *67/00*
U.S. Cl. 273—327 14 Claims



1. A juggling system having: at least one stick, a projectile rod assembly for dynamic sustainment by manual manipulation of the projectile rod assembly using thereagainst blows of said at least one stick, the projectile rod assembly being of the type having a rod with first and second ends, and a respective enlargement axially disposed on each of the first and second ends, characterized by: means for changing said dynamic sustainment characteristics of the projectile rod assembly, including: each of the enlargements having cup shape with a rim and a stable first position with the cup shape facing coaxially outward on the rod, the enlargements being of a flexible material, and said rim having a diameter permitting the cup shape to be partially reversed by being flexed axially back over itself to a second position providing for a portion of said at least one stick to be engaged in said partially reversed cup shape at said second position, as an aid in dynamic sustainment.

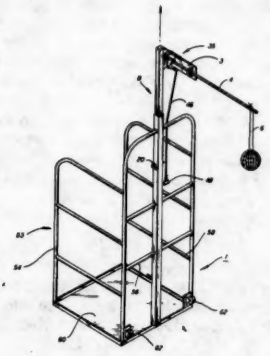
4,881,742
VOLLEYBALL TECHNIQUE TRAINER

Francis M. Hargreave, P.O. Box 1104, Quogue, N.Y. 11959

Filed Nov. 14, 1988, Ser. No. 271,032
Int. Cl.[4] A63B *69/00*
U.S. Cl. 273—413 8 Claims

1. An apparatus for use in teaching volleyball techniques, comprising:
support means supporting said apparatus in a substantial horizontal orientation at predetermined height above a surface;

an arm member having a first end rotatably supported by said support means such that said arm rotates about a substantially horizontal axis;



a ball; and

means for semi-rigidly suspending said ball from a second end of said arm member.

4,881,743

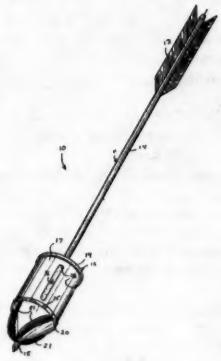
SCENT HEAD ARROW

William S. Fiorenzo, 49A Traphsen Rd., Wayne, N.J. 07470

Filed Jun. 8, 1988, Ser. No. 203,890

Int. Cl.[4] F41B *5/02*

U.S. Cl. 273—418 2 Claims



1. A scent head arrow for imparting an animal scent during flight and impact of the arrow comprising,

an arrow including guidance means at one end of said arrow and a weighted forward tip secured to a forward portion of said arrow, and

a scent head container means arranged for securement to the arrow adjacent the tip, and

said scent head container including a cylindrical body, a top cap securable to an uppermost end of said body, and a forward conical cap for securement to a lowermost end of said body, and

scent means contained within said scent head container for distributing scent throughout the flight and impact of said arrow through openings formed in said scent head container, and

wherein said openings include a plurality of radial slots formed in said top cap, and

wherein openings further include a series of slots formed in said cylindrical body arranged parallel to the axis of said cylindrical body, and

wherein said top cap and forward conical cap include central openings for accepting said arrow therethrough, and

wherein said conical cap is formed with a series of vanes for imparting rotation to said arrow during flight of said arrow.

4,881,744

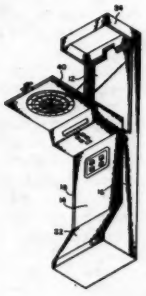
ELECTRONICALLY SCORED DART GAME HAVING FRONT OPENING SERVICE DOOR

Norman C. Hansen, Delanco, N.J., assignor to Merit Industries, Inc., Bensalem, Pa.

Filed Mar. 10, 1988, Ser. No. 166,353

Int. Cl.[4] F41J *5/04*; A47B *88/00*

U.S. Cl. 273—376 7 Claims



1. In an electronically scored dart game having a housing, including a front surface, a dart board on the housing front surface, the dart board comprising a plurality of generally vertically extending target plates, each target plate having a front surface including a plurality of openings for receiving the tip of a dart and having a rear surface, the dart board further comprising support means for supporting the target plates, the support means permitting a target plate to move rearwardly when receiving the tip of a dart within one of said openings, the support means including stop means for preventing the target plate from moving toward the front surface beyond the support means, and electronic means for sensing the rearward movement of the target plates and for determining a score, the electronic means including display means for displaying the score, the improvement comprising:

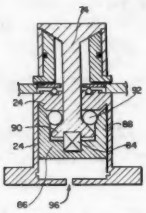
a service door for providing access to the interior of the housing from the front of the housing, the service door being formed of at least a portion of the housing front surface, including the dart board and having an upper end and a lower end, the service door being hinged to the housing along at least a portion of the lower end, whereby the service door is pivotable about the hinge for movement between a generally vertical operational position and a service position in which the service door extends outwardly from the front surface of the housing at a predetermined angle of less than 180 degrees, the service door including means for preventing the service door from pivoting to a position exceeding the predetermined angle, when in the service position gravity causes the target plates to engage the stop means and prevents the target plates from moving rearwardly with respect to the support means.

4,881,745

MECHANICAL PLATE CLAMP

Roger D. Peters, 152 Chicago Way, San Francisco, Calif. 94112

Filed Apr. 25, 1988, Ser. No. 185,504
Int. Cl.[4] B23Q 3/14
U.S. Cl. 279—4 **4 Claims**



1. A clamp for supporting a supported plate having a first side and a second side and an opening and a clamping area with a projected boundary on both said sides around said opening which comprises:

a plate support means having a first clamping surface in contact with said clamping area on said first side;

a segmented clamp means which comprises at least three segments and each segment comprises a flat segment plate having a straight beveled edge whose angle is complementary to an adjacent edge of a segment plate of a neighboring segment so that when said segments are withdrawn to said unloading position within said projected boundary, beveled edges of neighboring segments slide over one another so that said segment plates move to different planes thereby avoiding interference with one another and when said segment plates are in said clamping position, said adjacent beveled edges are in complementary contact with one another so that all the segment plates of all said segments lie in the same plane and wherein each said segment plate has attached to it an elastic band attachment means;

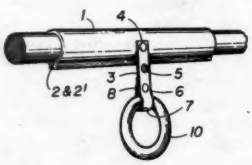
a clamp positioning means which moves said segmented clamp means between said clamping position and said unloading position which comprises a flat bearing having a surface in contact with said segment plates and a rod having a cam on its surface and an elastic band attached to said band attachment means which maintains said segments in sliding contact with said cam so that when said rod slides axially, said segments are constrained by said bearing surface and said cam to move between said unloading position and said clamping position.

4,881,746

HANDLE COVER AND TOY HOLDER

Sara Andreesen, 314 S. 17th, Ord, Nebr. 68862

Filed Jul. 25, 1988, Ser. No. 223,626
Int. Cl.[4] B62B 3/02, 9/26
U.S. Cl. 280—33.992 **5 Claims**



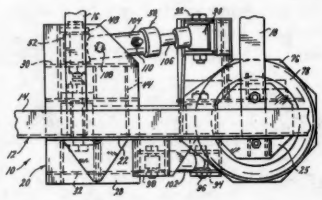
1. A cover and toy holder for a shopping cart handle comprised of a strip of washable fabric of a width sufficient to encompass a shopping cart handle and of a length sufficient to substantially cover the handle, said strip of fabric having closure means along the edges of both longitudinal sides of the strip, said strip of fabric being equipped with a strap, said strap being of a length at least as long as that required to snugly encompass said strip of fabric when compactly folded about its longitudinal length, said strap being equipped with a cooperating pair of closure means with the first closure means of the pair on the proximal portion of the strap and the second closure means of the pair on the distal portion of the strap at a distance from each other approximately equal to the girth of the folded strip of fabric, said strap being further equipped with third closure means cooperating with the second closure means located at a distance from said second closure means long enough to form a loop to hold a toy when this third closure means is engaged with the second closure means.

4,881,747

SELF STEERING SUSPENSION ASSEMBLY

John E. Raidel, Rte. 9, Box 400-M, Springfield, Mo. 65804

Filed Apr. 11, 1988, Ser. No. 179,762
Int. Cl.[4] B62D 61/12
U.S. Cl. 280—81.6 **20 Claims**



1. A consolidated, self-steering suspension system for a vehicle having a transmission, a chassis with side rails, and an axle, the system comprising:

a hanger means;

an axle seat adapted to support a vehicle axle;

an upper torque rod pivotally connected to the hanger means and the axle seat;

a lower torque rod pivotally connected to the hanger means and the axle seat;

wherein one of the torque rods is a piston and cylinder assembly arranged to selectively vary the length of the said one torque rod with one of the piston and cylinder of the assembly pivotally connected directly to the hanger means and the other of the piston and cylinder of the assembly pivotally connected directly to the axle seat.

4,881,748

STEERING SYSTEM FOR FRONT AND REAR WHEELS OF AUTOMOTIVE VEHICLE

Shoichi Sano; Yoshimi Furukawa; Masami Ogura; Masaru Abe, and Yasuharu Oyama, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 35,646, Apr. 7, 1987, Pat. No. 4,772,036, and a continuation-in-part of Ser. No. 822,008, Jan. 24, 1986, Pat. No. 4,703,946. This application May 9, 1988, Ser. No. 191,543
Claims priority, application Japan, Apr. 7, 1986, 61-79567; Sep. 9, 1986, 61-211929; Sep. 9, 1986, 61-211930
Int. Cl.[4] B62D 5/06
U.S. Cl. 280—91 **3 Claims**

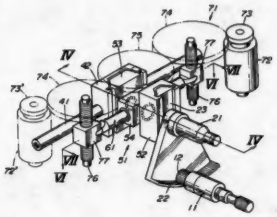
1. A steering system for steering front and rear wheels of an automotive vehicle, comprising:

a front steering means for steering front wheels;

a rear steering means for steering rear wheels at a steering

angle having a prescribed ratio to a steering angle for the front wheels;

said rear steering means including an adjustment device for varying the steering angle of the rear wheels and drive means for driving said adjustment device; and



said drive means including a gear mechanism connected with said adjustment device and a pair of motors coupled to said gear mechanism for driving said gear mechanism, said pair of motors being driven in association with each other.

4,881,749

STEERABLE FRONT AXLE FOR MOTOR VEHICLES

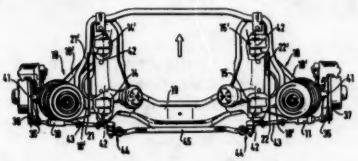
Paul Bausch, Hattenheim, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 6, 1988, Ser. No. 241,044

Claims priority, application Fed. Rep. of Germany, Sep. 9, 1987, 3730244

Int. Cl.[4] B62D *7/20*

U.S. Cl. 280—95.1 **9 Claims**



1. Steerable front axle for motor vehicles, comprising a steering knuckle for each of the two front wheels which is rotatably mounted on at least one axle connecting rod pivoted on the chassis via a connecting rod bearing, in which the axes of rotation of the connecting rod bearings are essentially arranged in the longitudinal direction of the motor vehicle, and one steering tie rod each associated with each of the front wheels, which steering tie rod is linked with a steering tie rod lever connected to the corresponding steering knuckle, in which a steering mechanism connected to the steering tie rods is arranged between the two steering tie rods, characterized in that, for hydraulic length adjustment, the steering tie rods have an expansion chamber to which a hydraulic fluid can be admitted and that both the connecting rod bearings associated with each of the front wheels have a hollow displacement zone between the junction points of the axle connecting rod and the chassis which displacement zone is compressible in the longitudinal direction of the vehicle and in which the hydraulic fluid is housed which enters the expansion chamber of the steering tie rod of the associated front wheel via a hydraulic tube in the case of the compression of the displacement zone which occurs during braking.

4,881,750

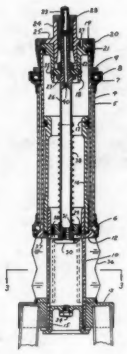
ATB SHOCK ABSORBER

Dirck T. Hartmann, 4121 Morning Star Dr., Huntington Beach, Calif. 92649

Filed Feb. 6, 1989, Ser. No. 306,913

Int. Cl.[4] B62K *21/20*

U.S. Cl. 280—276 **4 Claims**



1. In an All Terrain Bicycle with a conventional frame including a head tube and a front fork, an ATB Shock Absorber providing an improved means of shock and vibration isolation and comprising:

a separate steering tube mounted on angular contact ball bearings in said head tube;

a fork tube slidably mounted inside said steering tube with a means for transferring torque from said steering tube to said fork tube;

a fork crown rigidly fastened on the lower end of said fork tube with a means for sealing the lower end of said fork tube.

a fork tube extension rigidly fastened on the upper end of said fork tube and slidably mounted inside said steering tube, with a sealant means for sealing against the loss of compressed air between said fork tube and said fork tube extension;

a seal installed on the upper end of said fork tube extension preventing the loss of compressed air between said fork tube extension and said steering tube;

a plug rigidly clamped in the upper end of said steering tube and a means for sealing between said plug and said steering tube against the loss of compressed air;

a damper tube rigidly clamped to said plug with a length of said damper tube extending up through the center of said plug, and a length of said damper tube extending down inside the upper end of said fork tube;

a means for sealing against the loss of compressed air between said damper tube and said plug;

a floating piston slidably mounted on said damper tube with a means for preventing the passage of any compressed air or any hydraulic fluid past said floating piston;

a spring holding said floating piston against a damper head fastened in the lower end of said damper tube.

a pneumatic valve installed inside the upper end of said damper tube with an air passageway connecting said pneumatic valve with the inside of said steering tube;

a handlebar stem rigidly clamped to said plug with a short length of the damper tube extending above said handlebar stem;

a short length of the upper end of said fork tube extension having reduced inside diameter;

a portion of said plug with a reduced outside diameter extending a short distance down from the top end of said steering tube with the upper end of said fork tube exten-

sion sliding over said reduced outside diameter portion of said plug near the upper end of the shock absorber stroke;
a seal on said plug trapping an annular volume of air between said plug and said fork tube extension near the end of the shock absorber stroke; and
an elastomeric boot installed between said steering tube and said fork tube to prevent the intrusion of dirt.

4,881,751

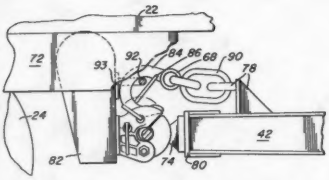
ARTICULATED TRUCK/TRAILER COMBINATION: SECOND CARGO UNIT COUPLING MECHANISM

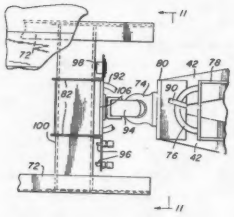
Albert Torcomian, Havertown, Pa., assignor to LHT Industries, Inc., Bala Cynwyd, Pa.

Continuation of Ser. No. 1,057, Jan. 7, 1987, abandoned. This application Nov. 17, 1988, Ser. No. 273,126

Int. Cl.[4] B60D *1/00*

U.S. Cl. 280—457 **1 Claim**





1. A cargo-carrying vehicle comprising:
a power unit;
a first cargo-carrying unit releasably mounted on the power unit, the first cargo-carrying unit having a chassis and a torsional tube rigidly affixed to the chassis, the torsional tube having an axis;
a second cargo-carrying unit having a drawbar affixed thereto, the drawbar having one end extending from the second cargo-carrying unit, the drawbar including an eye affixed to the one end thereof and safety hook connected thereto; and
means, including a mounting rigidly affixed to the torsional tube and extending generally vertically and radially outwardly from the torsional tube, the mounting including first and second generally parallel spaced arm members surrounding and rigidly affixed to the torsional tube and extending downwardly therefrom, a plate secured to the downwardly extending portion of each of the arm members, a coupler rigidly affixed to the plate for receiving the eye on the drawbar and a ring member affixed to the plate for receiving the safety hook, for releasably and pivotally coupling the one end of the drawbar to the torsional tube at a location displaced form the axis of the torsional tube, the torsional tube twisting about its axis, as required, in response to generally horizontal movement of the one end of the drawbar to provide a non-rigid coupling of the second cargo-carrying unit to the first cargo-carrying unit.

4,881,752

INDEPENDENT REAR WHEEL SUSPENSION SYSTEM

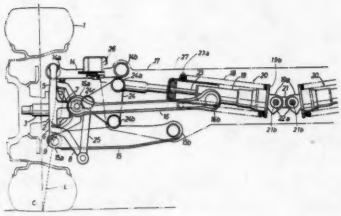
Hiromasa Tanaka, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 2, 1988, Ser. No. 227,271

Claims priority, application Japan, Aug. 3, 1987, 62-194209; Aug. 3, 1987, 62-194211; Aug. 3, 1987, 62-194212; Aug. 3, 1987, 62-194210; Sep. 4, 1987, 62-135275[U]

Int. Cl.[4] B60G *3/00*

U.S. Cl. 280—690 **17 Claims**



1. A rear wheel suspension system, comprising:
a pair of hub carriers each for rotatably supporting a wheel;
a plurality of lateral links for coupling said hub carriers to a vehicle body;
a pair of bell crank members pivotally supported by said vehicle body at first ends;
a pair of coupling rods each pivotally connected at one end to a corresponding one of said hub carriers and at another end connected to a second end of a corresponding one of said bell crank members; and
a pair of shock absorbers each consisting of a spring and a linear hydraulic damper for controlling impacts which are applied to one of said wheels and connected at one end to said vehicle body and to a third end of a corresponding one of said bell crank members.

4,881,753

AIR SUSPENSION SYSTEM WITH AN AIR DRIER

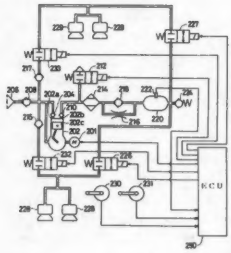
Kotaro Shima, Toyota; Masaharu Ohba, Aichi, and Masakatsu Nonaka, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Nov. 29, 1988, Ser. No. 277,187

Claims priority, application Japan, Nov. 30, 1987, 62-301666

Int. Cl.[4] B60G *17/08*

U.S. Cl. 280—707 **4 Claims**



2. An air suspension system for a vehicle comprising:
an air actuator for a wheel of the vehicle;
a compressor for supplying air to the air actuator;
an air circuit including a first path connecting the compressor and the air actuator through a raising valve, and a

second path connecting the air actuator and the compressor through a lowering valve;

an accumulator equipped with a pressure sensor in the first path;

an air drier in the first path between the accumulator and the compressor, the air drier containing reversible desiccating material;

an exhaust path branching from the first path between the air drier and the compressor, and having a discharge valve for discharging air from the air circuit to the atmosphere;

a one-way throttle valve in the first path between the accumulator and the air drier that throttles air from the accumulator, but freely passes air from the air drier;

a vehicle-height controller for operating the compressor to transfer air from the air actuator, via the air drier and the one-way throttle valve, to the accumulator when lowering the vehicle height; and

a subsidiary controller for opening the discharge valve when both the raising valve and the lowering valve are shut and the pressure of the accumulator exceeds a preset value, thus discharging the air from the accumulator through the one-way throttle valve and the air drier to regenerate the air drier.

4,881,754

SAFETY DEVICE FOR THE OCCUPANT OF THE CENTRAL REAR SEAT POSITION IN A MOTOR VEHICLE

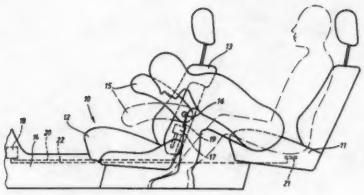
Hans Lütze, Aidlingen, and Falk Zeidler, Sindelfingen, both of Fed. Rep. of Germany, assignors to Mercedes-Benz AG, Stuttgart, Fed. Rep. of Germany

Filed Aug. 29, 1988, Ser. No. 237,759

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1987, 3729392

Int. Cl.[4] B60R *21/08*

U.S. Cl. 280—728 **15 Claims**



1. Safety device for the occupant of the central rear seat position in a motor vehicle, having an upholstered arm-rest arranged between the front seats which is constructed pivotable about a horizontal pivot axis aligned transversely to the longitudinal direction of the vehicle, wherein a pivoting drive engages the arm-rest in order to pivot the latter out of a position extending horizontally in the longitudinal direction of the vehicle towards the front seat back-rests, and wherein the pivoting drive is connected to a sensor which detects a vehicle deceleration and which generates an output signal which trips the pivoting drive to erect the arm-rest when a prescribed value of the integrated vehicle deceleration is exceeded.

4,881,755

STEERING DEVICE FOR MOTOR VEHICLE

Eric Vuagnat, Carre d'Aval, 1252 Meinier, Switzerland

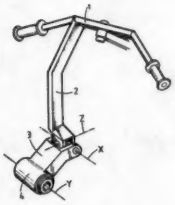
Filed Aug. 5, 1988, Ser. No. 228,736

Claims priority, application Switzerland, Aug. 5, 1987, 3007/87

Int. Cl.[4] B62D *1/18*

U.S. Cl. 280—779 **7 Claims**

1. A steering device for a motor vehicle having a single front wheel, such as motor cycles, side cars and three-wheeled vehicles, which steering device comprises a handle bar pivotally mounted on a frame of the vehicle, said handle bar fixed to a first end of a steering rod to form a monolithic steering assembly, said steering assembly being offset from the plane of the wheel to be steered, a second end of said steering rod being connected by double articulation means to a support means for



the bearing of said wheel, the pivot axis of said steering assembly on said support means residing in a plane which is parallel to the axis of said wheel bearing, and said wheel bearing support means being connected to the frame of said vehicle by suspension means.

4,881,756

VEHICLE STRUCTURE, ESPECIALLY CHASSIS FRAME STRUCTURE

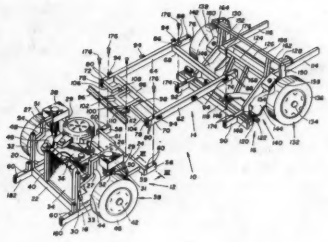
Hideyuki Kumasaka, Yokohama; Kouji Takao, Atsugi, and Hiroshi Kuriyama, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Feb. 10, 1988, Ser. No. 154,406

Claims priority, application Japan, Feb. 10, 1987, 62-29051; Feb. 25, 1987, 62-26892[U]; Feb. 25, 1987, 62-42380

Int. Cl.[4] B62D *21/12*

U.S. Cl. 280—785 **13 Claims**



1. A method for assembling a chassis structure for a vehicle comprising:

providing a front frame module having a front frame section with bracket means at the rear end thereof;

providing a rear frame module having a rear frame section with bracket means at the front end thereof;

installing chassis sub-assemblies including an engine, wheels and a suspension system in said front frame module;

installing chassis sub-assemblies including wheels and a suspension system in said rear frame module;

interposing a center frame module having a center frame section between said front and rear frame modules, said center frame section having at the front and rear ends thereof bracket means respectively associated with said bracket means at the rear and front ends of said front and rear frame sections; and

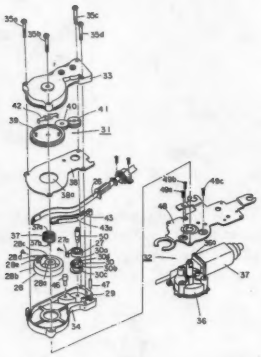
mechanically fastening said bracket means of said center frame module to said bracket means of said front and rear frame modules.

4,881,757

DRIVE DEVICE FOR VEHICLE PASSIVE SAFETY BELT

Juichiro Takada, 12-1, Shinmachi 3-chome, Setagaya-ku, Tokyo, Japan

Filed Feb. 1, 1989, Ser. No. 305,296
Claims priority, application Japan, Feb. 3, 1988, 63-21912
Int. Cl.[4] B60R *21/10*
U.S. Cl. 280—804 **2 Claims**



1. A drive device for a vehicle passive safety belt system in which the belt is wound automatically between a restraining configuration and a releasing configuration in response to opening and closing of the vehicle door, comprising a first rotatable drum, a flexible drive tape having one end affixed to the first drum and leading from the first drum along a constrained path to a belt guide that is movable along a guide rail in the vehicle, a second rotatable drum positioned adjacent the path of the drive tape and proximate to the first drum, a flexible driving band having one end affixed to the first drum and its other end affixed to the second drum, the driving band overlapping the drive tape and being arranged to wind onto the second drum while unwinding from the first drum conjointly with the drive tape and to keep the drive tape from slackening on the first drum upon unwinding, drive means for conjointly rotating the first and second drums selectively in one direction to wind the driving band onto the second drum and unwind the drive tape and the driving band from the first drum and in the opposite direction to wind the drive tape and driving band onto the first drum and unwind the driving band from the second drum, a spring coupled between the first drum and the drive means and biasing the first drum in said opposite direction relative to the drive means and yieldable to enable the first drum to rotate at a speed different from the drive means, and a lost motion coupling between the second drum and the drive means and adapted to couple the drive means to the first drum upon rotation in said one direction and to permit free rotation of the second drum within a predetermined range relative to the drive means upon rotation in said opposite direction.

4,881,758

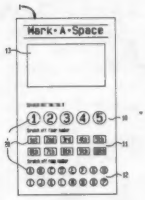
PARKED VEHICLE LOCATING AID

David Ben-David, 6770 Indian Creek Dr., Miami Beach, Fla. 33141

Filed Jan. 30, 1989, Ser. No. 303,901
Int. Cl.[4] B42D *15/00*
U.S. Cl. 283—102 **6 Claims**

1. A vehicle location aid for use with (a) a parking lot divided into a plurality of areas, each said area having a corresponding unique area designation, and (b) a vehicle located in one of said areas, said location aid comprising:

a card comprising a printed section, said section having a series of indicia, each member of said series corresponding uniquely to one of said area designations; and



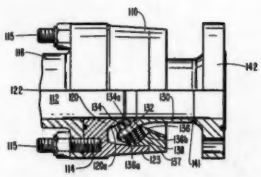
recording means for recording the member corresponding uniquely to the designation of the area in which said vehicle is located.

4,881,759

ALL WELDED SOUND ISOLATION FLEXIBLE CONNECTION

Frank J. Kovitch; Charles M. Reinhardt, both of Arlington, and Paul E. Sullivan, Bedford, all of Tex., assignors to Lockheed Corporation, Calabasas, Calif.

Filed Jan. 4, 1988, Ser. No. 140,471
Int. Cl.[4] F16L *55/02*
U.S. Cl. 285—49 **7 Claims**



1. In a flexible joint for pipelines where an annular housing has a nipple partially submerged therein with said nipple having a flared end on the submerged portion, control of sound and vibration transmission along the pipeline being a critical characteristic, the combination which comprises:

(a) an elastomer ring adhered to the inner surface of said flared end and internally contoured spherically with respect to a common center point spaced from said flared end and located on the longitudinal axis of said joint;

(b) an elastomeric body having an assembly of concentric spherical rings embedded therein, with said elastomeric body adhered to the outer surface of said flared end and with said spherical rings contoured and positioned symmetrically to said common center point;

(c) a collar encircling said nipple and engaging the outer surface of said elastomeric body to maintain said elastomeric body in position, said collar being weldably mounted to said housing to reduce the level of sound and vibration transmission through the flexible joint as compared to a flexible joint where the collar is bolted to said housing; and

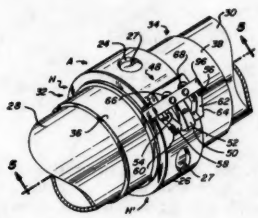
(d) a support structure within said housing having an outward facing spherical surface mating in sliding relation with the internal surface of said elastomeric ring.

4,881,760

CONDUIT COUPLING DEVICE WITH REDUNDANCY FEATURES

Richard R. Runkles, Englewood; John A. Dyer, Westminster, and Jack W. Beyer, Denver, all of Colo., assignors to Stanley Aviation Corporation, Aurora, Colo.

Filed Nov. 7, 1988, Ser. No. 267,841
Int. Cl.[4] F16L *23/00, 23/04;* A41F *1/00*
U.S. Cl. 285—93 8 Claims



1. A coupling assembly for releasably interconnecting confronting ends of first and second fluid carrying conduit members wherein each has an annular flange fixedly attached to each of the confronting ends, each flange having means defining an external peripheral groove and a sealing ring positioned in each of the flange grooves, said assembly comprising:

a sleeve for circumferentially surrounding the sealing rings and the flanges;

a pair of arcuate coupling halves pivotally joined together at first adjacent ends for circumferentially surrounding said sleeve, each of said coupling halves including an arcuate circumferential wall having a pair of spaced ribs extending inwardly from opposite circumferential edges thereof;

a central longitudinal channel on the outer surface of the opposite end of one of said coupling halves;

a pair of longitudinal locking channels on the outer surface of said opposite end of said one coupling half, one of said pair of channels being located on one side of said central channel and the other of said pair of channels being located on the other side of said central channel, each of said pair of channels having a locking surface and an inner side edge tapered inwardly in the longitudinal direction of tine movement during closing;

a central tine extending longitudinally from the outer surface of the opposite end of the other of said coupling halves, being aligned for reception within said central channel; and

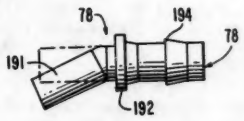
a pair of resilient locking tines extending longitudinally from the outer surface of the opposite end of said other of said coupling halves, one of said pair of locking tines being laterally spaced to one side of said central tine and the other of said pair of locking tines being laterally spaced to the other side of said central tine, each of said locking tines being aligned for reception within said respective pair of locking channels and each having an outer edge with a radius so that each said inner side edge of said locking channels makes substantially line contact with each of said outer edges of said respective locking tines during closure and release and each further including a locking surface which snaps into engagement with locking surfaces of said respective locking channels to releasably hold said coupling halves in closed position around said sleeve.

4,881,761

IRRIGATION TUBING CONNECTOR FOR AN ULTRASONIC SURGICAL SYSTEM

Robert W. Hornlein, Stamford; Joseph N. Logan, Trumbull, both of Conn.; Alan Broadwin, Brooklyn, N.Y., and Vaclav O. Podany, New Fairfield, Conn., assignors to Cooper LaserSonics, Inc., Stamford, Conn.

Division of Ser. No. 849,830, Apr. 9, 1986, Pat. No. 4,747,820.
This application May 26, 1988, Ser. No. 198,836
Int. Cl.[4] F16L *33/00, 47/00, 49/00*
U.S. Cl. 285—239 3 Claims



1. An irrigation tubing connector for use in connection with a nosecone adapter in an ultrasonic surgical system of the type which includes an irrigation cowl defining an irrigation port of an irrigation fluid passage in an assembled handpiece of an ultrasonic surgical system, said irrigation tubing connector comprising:

an elongated tubular body, said elongated body defining a first tubular end portion structurally adapted for insertion in the irrigation port;

a radially extending, generally centrally located rib portion limiting the insertion of said first portion in the irrigation port, and

said tubular body defining a second tubular end portion for insertion in a tubing end of irrigation tubing, the insertion of said second end portion being limited by said rib,

said first portion has an axis which is oriented at an acute angle relative to an axis of said second portion, so that the irrigation tubing can extend along a portion of the handpiece,

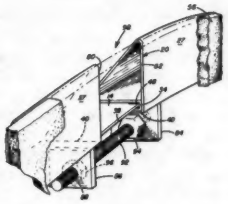
said second portion includes a circumferentially located barb tapered to facilitate slip fitting of the irrigation tubing thereonto and inhibiting withdrawal therefrom.

4,881,762

DUCT CONNECTOR FOR A CIRCULAR DUCT

Peter J. Arnoldt, Clairton, Pa., assignor to Ductmate Industries, Inc., Monongahela, Pa.

Filed Jun. 10, 1988, Ser. No. 205,305
The portion of the term of this patent subsequent to Sep. 19, 2006, has been disclaimed.
Int. Cl.[4] F16L *23/00*
U.S. Cl. 285—367 19 Claims



1. A duct joint frame assembly for connecting the end portions of generally circular ducts comprising,

a pair of circular frame members each having spaced end portions, each said frame member connected to an end portion of a circular duct and having a gap formed between said end portions,

each said frame member having a vertical wall portion ex-

tending upwardly from said circular duct end portion, said vertical wall having a bottom portion and a top portion,

stiffening means connected to each said frame member vertical wall portion at said vertical wall top portion, said stiffening means extending rearwardly away from said vertical wall portion,

said stiffening means forming an annular pocket means for receiving said circular duct end portion,

a portion of each of said duct end portions arranged to extend into said gap to a location adjacent said frame member vertical wall portion,

gasket means positioned between a pair of adjacent frame members vertical wall portions, said gasket means arranged to contact said pair of adjacent vertical wall portions, and

means for urging said pair of adjacent vertical wall portions towards each other and into further contact with said gasket means to provide a seal between said pair of adjacent vertical wall portions and between said gasket and said portions of said duct end portions in said gaps.

4,881,763

FUEL INJECTION LINE WITH COMPRESSION NIPPLE FORMED THEREON BY UPSETTING AND PROCESS FOR THE PRODUCTION THEREOF

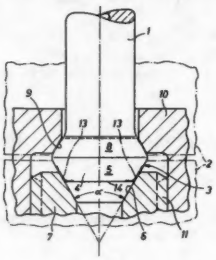
Jürgen Guido, Berliner Strasse 6, D-8402 Neutraubling, and Norbert Binzer, Neutraubling, both of Fed. Rep. of Germany, assignors to Jürgen Guido, Neutraubling, Fed. Rep. of Germany

Filed Oct. 31, 1988, Ser. No. 264,931

Claims priority, application Fed. Rep. of Germany, Jan. 21, 1988, 3801703

Int. Cl.[4] C21D *1/00;* **F02M** *55/02;* **F16L** *19/00, 35/00*

U.S. Cl. 285—382 **10 Claims**



1. A fuel injection line for an internal combustion engine including at, at least one of the line's ends, a compression nipple formed thereon by upsetting, the nipple comprising a forward sealing taper portion (4) having a sealing surface (5) which with plastic deformation thereof serves for sealing against a hollow taper surface (6) of matching taper angle of a co-operating portion (7) which is harder than said sealing surface (5), the nipple also comprising a rearward bearing surface (8) for bearing against a hollow taper surface (9) of a cap nut (10), the rearward bearing surface (8) being in the form of a spherical segment which blends into the outside periphery of an adjoining pipe portion by way of a rounded portion, wherein the injection line is formed from a pipe of steel of cold-worked hardness, the compression nipple is formed by upsetting on said pipe and the compression nipple is subjected to inductive soft annealing only in a material zone (13) defined by a contact surface at which said forward sealing taper portion (4) is to be in contact against said hollow taper surface (6) of said co-operating portion.

4,881,764

LOCKING DEVICE

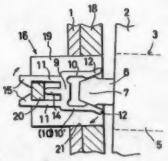
Atsushi Takahashi, Fujisawa, and Haruhiko Watari, Tokyo, both of Japan, assignors to Nifco Inc., Yokohama, Japan

Filed Aug. 22, 1988, Ser. No. 235,176

Claims priority, application Japan, Aug. 27, 1987, 62-129173[U]

Int. Cl.[4] E05C *19/06*

U.S. Cl. 292—13 **4 Claims**



1. A locking device comprising a striker projecting from the back side of an openable wall hinged to a housing and a latch secured in a frontally inserted snap-fit engagement to the housing in a face-to-face relation to said striker for engaging with said striker and holding said striker in a snap-engaged state when said openable wall is closed, said latch including means for rotatably mounting said latch in said housing to be able to follow the direction of insertion of said striker into said latch, said means including resiliently flexible arm means snapped into engagement with a mounting portion on said housing as said arm means are inserted through a window in a front side of said housing, said arm means permitting pivotal movement of said latch relative to said housing during insertion of the striker into said latch.

4,881,765

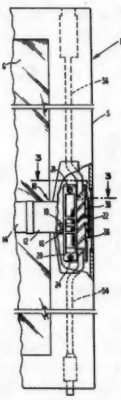
EXIT DEVICE HAVING LENGTH ADJUSTMENT MEANS FOR ITS CONCEALED VERTICAL RODS

George E. Heid, Charlotte, N.C., assignor to Yale Security Inc., Monroe, N.C.

Filed Feb. 19, 1988, Ser. No. 157,535

Int. Cl.[4] E05C *9/00*

U.S. Cl. 292—92 **5 Claims**



1. An exit device having a push bar and a slide adjacent the bar adapted to move vertically when the bar is pressed, the device being mounted waist high on a door having a hollow stile formed with an aperture adjacent the slide, a vertically disposed channel in the stile secured through the aperture to

the slide, a pair of blocks disposed in the channel having inclined engaging surfaces, retaining means to retain the engaging surfaces in slidable contact, wall means on the channel holding the first block against horizontal movement, threaded means in the channel holding the second block from moving vertically relative to the channel and for adjusting the position of the second block in a horizontal direction to raise or lower the first block, a vertical rod having an end attached to the first block, the other end of the vertical rod adapted to drive a latch on the door remote from the device.

4,881,766

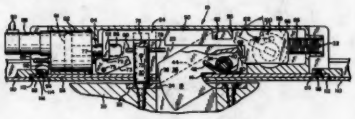
LOCK MECHANISM

Theodore E. Schmidt, Carlton, and Alfred J. Peirish, McMinnville, both of Oreg., assignors to Pacific Security Systems of America, Inc., Portland, Oreg.

Filed Sep. 9, 1987, Ser. No. 94,710

Int. Cl.[4] E05B *51/02*

U.S. Cl. 292—201 **8 Claims**



1. A pneumatically operated lock comprising:

a housing,

a latch bolt including a cam-surfaced end portion, the latch bolt being movably mounted within the housing and shiftable between an extended position where the end portion protrudes from the housing and a retracted position where the end portion is retracted within the housing, biasing means urging the bolt to its extended position,

a sliding actuator movably mounted within the housing for sliding linear movement,

means operatively connecting the actuator and latch bolt whereby on movement of the actuator in one direction to one position the latch bolt is shifted to a retracted position,

means operatively interposed between the actuator and latch bolt whereby on movement of the actuator in the opposite direction to another position a mechanical deadlock is produced deadlocking the latch bolt in an extended position, said actuator having an intermediate position between said one end and said other positions where the bolt is free to move between extended and retracted positions and urged to its extended position by said biasing means, and

a pneumatically operated extensible device for producing movement of the actuator.

4,881,767

LATCH DEVICE FOR FOLDABLE BACKREST OF AUTOMOTIVE SEAT

Nobuaki Kondo, Chigasaki, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed Dec. 13, 1988, Ser. No. 283,829

Claims priority, application Japan, Dec. 23, 1987, 62-328008

Int. Cl.[4] E05C *3/26*

U.S. Cl. 292—224 **11 Claims**

1. In a foldable backrest of an automotive seat, a latch device comprising:

a striker secured to a fixed member other than said backrest;

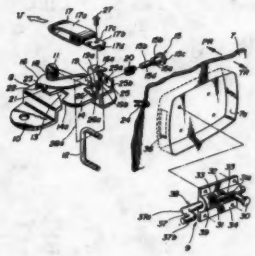
a base member secured to said backrest to move therewith;

a latch plate pivotally supported by said base member, said latch plate being latchingly engageable with said striker when said backrest assumes a given raised position;

a lock lever pivotally supported by said base member and having a portion contactable with a peripheral portion of said latch plate;

biasing means for biasing said lock lever and said latch plate in the same direction;

connecting means for selectively connecting said latch plate and said lock lever to achieve an integrated pivoting movement of said latch plate and said lock lever; and



actuating means for actuating said connecting means, said actuating means including a projection which, upon operation of said actuating means, pushes said latch plate to rotate the same in a direction to cancel the latched engagement between said latch plate and said striker and at the same time to induce a folding of said foldable backrest.

4,881,768

SECURITY DEVICE

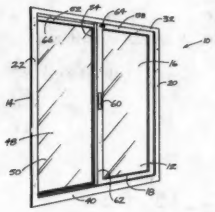
Edwin L. Lange, Bull Creek, Australia, assignor to Kenneth G. Kavanagh, Cottesloe and Edward I. Kavanagh, Thornlie, both of, Australia

Filed Dec. 22, 1987, Ser. No. 136,848

Claims priority, application Australia, Dec. 23, 1986, PH9655; Feb. 13, 1987, PI358

Int. Cl.[4] E05D *13/00*

U.S. Cl. 292—251 **4 Claims**



1. A security device for a sliding window or door and frame assembly, said sliding window or door including a border-frame around its periphery and being slidable to assume an open and a closed position in said frame assembly, said frame assembly defining upper and lower channel means in which said sliding window or door is slidable, said upper channel means comprising an outer depending portion, an inner depending portion and an upper frame portion, said security device comprising:

a projecting member having a shaft, a head located at one end of said shaft defining a circumferential groove so that when said security device is affixed to the front face of said border-frame of said sliding window or door beneath the edge of said outer depending portion said security device projects outwardly from said border-frame with said circumferential groove positioned adjacent to the lower edge of said outer depending portion of said upper

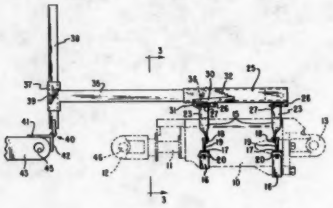
channel means to prevent removal of said sliding window or door from said frame assembly.

4,881,769

HANDLING DEVICE FOR HYDRAULIC CYLINDER

Paul D. Ims, R.R. 1, Box 180, Echo, Minn. 56237

Filed Jun. 23, 1988, Ser. No. 210,315
Int. Cl.[4] B25G *7/12*
U.S. Cl. 294—15 10 Claims



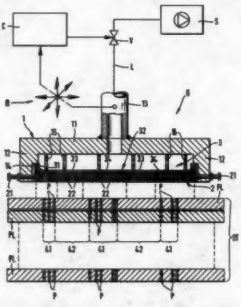
1. For use with a hydraulic piston-cylinder assembly having an attachment eye on said cylinder and a clevis attached to said piston, said clevis being attachable to a means to be operated by said assembly, carrying and adjustment means comprising strap means adapted to be attached to said cylinder, said strap means including T-shaped attachment means, handle means including forked members slideably engageable with said T-shaped attachment means or said strap means, said handle means when engaged being spaced from said cylinder whereby hand carrying is possible.

4,881,770

METHOD AND APPARATUS FOR TRANSPORTING PERFORATED OBJECTS

Francesco Marzinotto, Zürich, Switzerland, and Jürgen Junghans, Hof, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed Nov. 10, 1987, Ser. No. 118,934
Claims priority, application Switzerland, Nov. 10, 1986, 4481/86
Int. Cl.[4] B66C *1/02*
U.S. Cl. 294—64.1 21 Claims



1. A transport device for transporting perforated objects, comprising:

a gripper head including a permeable suction plate;

suction means connected with said gripper head for providing a pressure drop across said permeable suction plate;

means for adjusting the position of said gripper head;

means for controlling the operation of said suction means and said positioning means, said control means operable to place said gripper head against a perforated object and to actuate said suction means to hold said perforated object against said gripper head; and

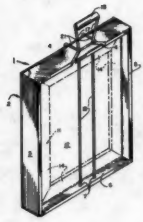
means for masking selected portions of said permeable suction plate, said selected portions being selected to align with portions of said perforated object having a relatively large number of perforations.

4,881,771

CARRIER FOR PAINTINGS

Wayne R. Sullivan, 2711 Lindholm, Shreveport, La. 71108

Filed Jun. 3, 1988, Ser. No. 202,020
Int. Cl.[4] B65D *61/00*
U.S. Cl. 294—151 10 Claims



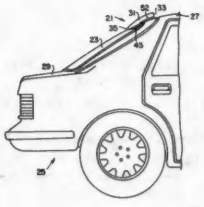
1. A carrier for a work of art comprising a frame having a closed back panel and an open front area for receiving the work of art; at least two spacers attached to said frame in spaced relationship for spacing the work of art from said back panel; a pair of spaced cord openings provided in one end of said frame and a pair of slotted holes provided in the opposite end of said frame; a continuous flexible cord having a first loop extended through said space cord openings and said slotted holes in spaced relationship; a handle attached to said cord; and a second loop extended around said back panel and looped over said handle and said first loop, for removably securing the work of art in said frame.

4,881,772

REAR-WINDOW WIND DEFLECTOR FOR A VEHICLE

Lee N. Feinberg, 10763A Lady Palm La., Boca Raton, Fla. 33498

Filed Oct. 11, 1988, Ser. No. 255,980
Int. Cl.[4] B62D *35/00*
U.S. Cl. 296—180.1 7 Claims



1. A wind deflector for use with a vehicle, said vehicle comprising a vehicle body having a rear window mounted in said body at low angles relative to horizontal, said wind deflector comprising a channel plate having a leading edge, a trailing edge, and a plurality of substantially parallel channels therethrough between said leading edge and said trailing edge, each channel having a cross-section that decreases smoothly from said leading edge to said trailing edge, said wind deflector

including means integral with said channel plate for mounting said channel plate directly on said rear window with said trailing edge over said window and said leading edge cantilevered over a portion of said vehicle body forward of said window.

4,881,773

SUNROOF PANEL ASSEMBLY

Hisao Ichinose, Atsugi, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed Aug. 23, 1988, Ser. No. 235,165

Claims priority, application Japan, Aug. 28, 1987, 62-130971[U]

Int. Cl.[4] B60J 7/11

U.S. Cl. 296—216 **12 Claims**

1. A sunroof panel assembly comprising:

an outer panel made of a synthetic resinous material and having an outer peripheral portion;

an inner panel made of metal and in the form of a frame covering said outer peripheral portion of said sunroof panel, said inner panel having an inner peripheral edge portion and an outer peripheral edge portion;

a non-curable adhesive bonding said inner panel to said outer peripheral portion of said outer panel;

an elastic member provided to at least part of said inner peripheral edge portion of said inner panel;

a curable adhesive bonding said elastic member to said outer peripheral portion of said outer panel; and

clip means for holding at least part of said outer peripheral portion of said outer panel and at least part of said outer peripheral edge portion of said inner panel tightly together so that said outer peripheral edge portion of said inner panel and said outer peripheral portion of said outer panel are slidingly movable relative to each other when there is a thermal expansion differential between said inner panel and said outer panel.

4,881,774

MEMORY SEAT TRACK ASSEMBLY FOR VEHICLE SEAT

David W. Bradley, St. Clair Shores; Angelo R. Melotti, Troy; Oliver Lecere, Farmington Hills, and Gerald P. Bonnici, St. Clair Shores, all of Mich., assignors to Bertrand Faure Automobile, Rocquencourt, France

Filed Nov. 7, 1988, Ser. No. 268,131

Int. Cl.[4] A47C 1/02; F16M 13/00

U.S. Cl. 297—341 **10 Claims**

1. A vehicle seat positioning assembly that comprises:

a seat;

a first channel fixed to the vehicle;

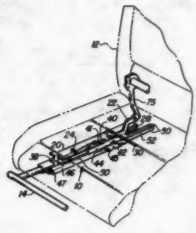
a second channel being slidably mounted on said first channel;

a latch means that secures the second channel to the first channel at a selected position;

a memory means that engages a third channel at the selected position;

a first release that unlatches the latch means and unlocks the memory means and allows said seat and said memory means to be moved to another position;

a second release that unlatches the latch means and allows said seat to be moved forwardly while leaving the memory means at the selected position; and



upon actuation of the second release, the assembly allowing the seat to be moved forwardly and, upon returning rearwardly, stopping the seat at the selected position;

4,881,775

RECLINING SEAT BACK APPARATUS AND METHOD OF UTILIZATION THEREOF

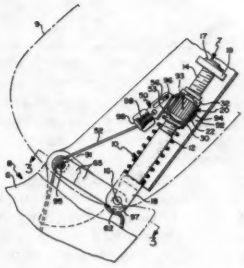
Richard W. A. Rees, Holland Landing, Canada, assignor to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 154,756, Feb. 11, 1988. This application Feb. 1, 1989, Ser. No. 304,436

The portion of the term of this patent subsequent to Apr. 25, 2006, has been disclaimed.

Int. Cl.[4] A47C 1/00; B60N 1/02

U.S. Cl. 297—361 **1 Claim**



1. A vehicle seat recliner seat latch for setting the inclination of a seat back having an aperture and being pivotally mounted with respect to a seat cushion along a first pivotal axis, said seat latch in combination comprising:

A threaded rod pivotally mounted with respect to said seat cushion along a second pivotal axis generally parallel with said first axis;

a sleeve threadably connected on said rod with exterior gear teeth;

bearing means capturing said sleeve and being pivotally mounted in said aperture of said seat back along a third pivotal axis fixed with respect to said seat back;

a first spring encircling said rod and captured between said second pivotal axis and said third pivotal axis urging said seat back away from said second pivotal axis and biasing said seat back towards an upright position;

a second spring having a fixed position with respect to said seat back and a slider having an inclined slot and being mounted by said inclined slot along a rod fixed with respect to said seat back, whereby said slider is biased by said second spring into a position to selectively incremen-

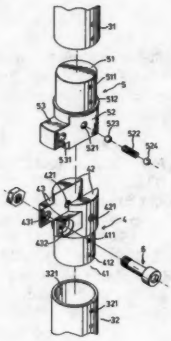
tally engage with said gear teeth of said sleeve for restraining said sleeve from rotating on said rod to set the inclination of said seat back and whereby said slider is connected with a release cable to pull said slider away from engaging with said sleeve to allow the adjusting of the inclination on said seat back.

4,881,776

CHAIRS WITH FOLDABLE BACKS

Oliver Wang, Taipei, Taiwan, assignor to Casual Living International Inc., San Francisco, Calif.

Filed Nov. 22, 1988, Ser. No. 275,004
Int. Cl.[4] A47C 7/40
U.S. Cl. 297—379 1 Claim



1. A chair, comprising:

a chair seat and a chair back, said chair back connected to and generally upstanding from an edge of said chair seat;

said chair back including an upper back frame having two downwardly directed spaced-apart upper legs, and a lower back frame having two upwardly directed spaced apart lower legs, said lower legs connected to said upper legs by individual pivot means;

each of said pivot means including an upper connector secured to said upper leg, a lower connector secured to said lower leg, a pivot pin interconnecting said upper and lower connectors, and a lock mechanism for releasably interlocking said upper and lower connectors to prevent relative rotation therebetween, one of said upper and lower connectors including two spaced-apart generally parallel first projections extending from an end thereof, the other of said upper and lower connectors including a second projection extending from an end thereof, said second projection disposed between said two spaced-apart first projections;

each of said first and second projections including transversely extending parallel lugs through which coaxial pivot holes are formed for receiving said pivot pin, thereby allowing rotational relative movement between said upper and lower connectors;

said lock mechanism including at least one positioning hole formed in an inner surface of one of said first projections, and a spring and at least one spring biased ball retained in said second projection, said ball having a portion extendable from a surface of said second projection and urged by said spring to engage the positioning hole when said locking mechanism is in the locked position;

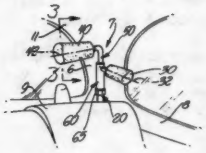
whereby, when said upper back frame is rotated relative to said lower back frame about said pivot pin, said ball moves away from the positioning hole thereby releasing said lock mechanism, and said upper back frame is folded so as to situate adjacent said lower back frame.

4,881,777

APPARATUS AND METHOD OF UTILIZATION THEREOF OF A PROFILE HEADREST

Glenn E. Dorshimer, Ann Arbor, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 22, 1988, Ser. No. 234,854
Int. Cl.[4] A47C 7/38
U.S. Cl. 297—406 5 Claims



1. A vehicle seat headrest for a seat occupant of a vehicle seat, said headrest in combination comprising:

a post means comprised of at least two independent colinear members for mounting said headrest with respect to said vehicle seat in a generally upward extending vertical fashion;

an upper head support adjustably horizontally pivotally connected to said post means for supporting the head of an occupant of said seat, whereby said headrest can be adjusted to a profile of a seat occupant; and

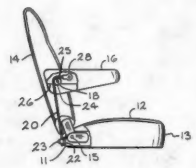
a lower head support connected with said post means and generally parallel with and vertically spaced from said upper head support and said lower head support is autonomously adjustably horizontally pivotally connected to said post means independent of said upper head support.

4,881,778

VEHICLE SEAT ASSEMBLY WITH AUTOMATICALLY MOVABLE ARM REST

Robert L. Stephenson, Orchard Lake, and Harvey R. Rumpel, Plymouth, both of Mich., assignors to Hoover Universal, Inc., Ann Arbor, Mich.

Filed Aug. 15, 1988, Ser. No. 232,216
Int. Cl.[4] A47C 7/54
U.S. Cl. 297—417 1 Claim



1. A seat assembly for a motor vehicle comprising:

a seat cushion having front and rear ends;

a seat back having upper andlower ends and extending upwardly in an upright position from said seat cushion adjacent said rear end thereof, means pivotally supporting the lower end of said seat back on said seat cushion such that said seat back can be pivotally moved forwardly from said upright position toward a forwardly inclined position;

an arm rest having a forward end and a rearward end, an arm rest pivot member pivotally connecting the rearward end of said arm rest to said seat back at a position between said upper and lower ends of said seat back, said arm rest having an operative position extending forwardly from said seat back and said arm rest being pivotable from said operative position to a raised position along side said seat back;

means operatively associated with said arm rest for pivotally raising said arm rest from said operative position toward said raised position as said seat back is pivoted from an upright position toward said forwardly inclined position, said raising means including cam means adjacent said arm rest pivot member, said cam means having an arcuate cam surface above and rearward of said arm rest pivot member, and a cable attached at one end to said seat cushion at a predetermined attachment point and attached at the opposite end to said arm rest at a position forwardly of said cam means and said arm rest pivot member, said cable extending over and behind said cam surface and engaging said cam surface at a location rearwardly of said arm rest pivot member, said one end of said cable being attached to said seat cushion at a location relative to said seat back pivotal support means such that as said seat back is pivoted from said upright position toward said forwardly inclined position, the distance between said predetermined cable attachment point and the location of engagement of said cable with said cam surface is increased, thereby increasing tension in said cable, said opposite end of said cable being attached to said arm rest at a location such that the tension in said cable acts upon said arm rest to create a moment about said arm rest pivot member in a direction to pivot said arm rest from said operative position toward said raised position and

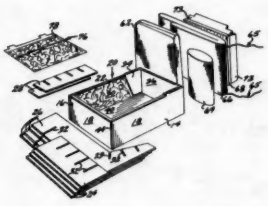
spring means operatively associated with said cable for maintaining sufficient tension in the cable to avoid slack in the cable when said arm rest is in said raised position.

4,881,779

PACKED TRANSPORTABLE FURNITURE

Ray Bubien, Rolling Hills Estates, Calif., assignor to Arma, Inc., Rolling Hills Estates, Calif.

Filed Apr. 3, 1989, Ser. No. 332,891
Int. Cl.[4] A47C *7/00*
U.S. Cl. 297—442 **18 Claims**



1. A packed transportable furniture article of manufacture made of corrugated paper or fiberboard that comprises:

a foldable reversible furniture frame having left, right, front, and rear sides, bottom flanges, and a back support wherein said left, right, front and rear sides and said back support are covered on one surface with foam or bonded polyester padding; and

wherein said foldable reversible furniture frame has a container mode and a frame mode such that when in said container mode said foldable reversible furniture frame is folded to form an open box with all outside surfaces of said box being corrugated paper or fiberboard and such that when said foldable reversible furniture frame is in said frame mode said foldable reversible furniture frame is folded to form a frame for a chair loveseat, sofa, or sectional sofa and said foam or bonded polyester padding on said left, right, front and rear sides and said back support is on the outside surfaces of said foldable reversible furniture frame; and

a honeycomb support having longitudinal and latitudinal members forming a seat structure and a back structure mounted inside said foldable reversible furniture frame in said frame mode and packed inside said foldable reversible furniture frame in said container mode; and

a seat platform placed on top of said honeycomb support on said seat structure when said foldable reversible furniture frame is in said frame mode and packed inside said foldable reversible furniture frame in said container mode; and

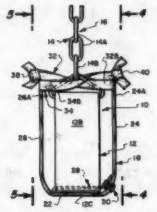
a back platform placed on top of said honeycomb support on said back structure when said foldable reversible furniture frame is in said frame mode and packed inside said foldable reversible furniture frame in said container mode.

4,881,780

SECURING DEVICE AND METHOD FOR HOLDING A CHILD UPRIGHT ON A SWING SEAT

Graciela Barnes, 4566 El Carro La., Carpinteria, Calif. 93013

Filed Sep. 2, 1988, Ser. No. 239,800
Int. Cl.[4] A47C *31/00, 3/02*
U.S. Cl. 297—467 **12 Claims**



1. A securing device for holding a child upright on a moving swing seat, said device comprising:

(a) an elongated panel of flexible material, said panel having an intermediate portion extendable in forward-and-aft relation below a swing seat and front and rear portions connected to and extending in opposite directions from said intermediate portion, said front and rear panel portions extendable upwardly from the front and rear of a swing seat and along the front and rear of a child seated on the swing seat, said front and rear panel portions having respective outer ends located proximate the elevation of the arm pits of the child seated on the swing seat;

(b) means attached to said intermediate portion of said panel for anchoring said intermediate portion to the swing seat in underlying relation thereto between opposite lateral sides thereof, said anchoring means including an elastic strap extendable in forward-and-aft relation above the swing seat opposite said intermediate panel portion extending below the swing seat, said strap being attached to one end to a first location on said intermediate panel portion; and means for detachably attaching an opposite end of said strap to a second location on said intermediate panel portion being spaced from said first location thereon; and

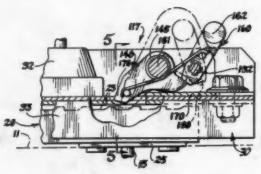
(c) means attached to said respective outer ends of said front and rear penal portions being extendable about the child and flexible members supporting the swing seat for coupling said front and rear panel portions to the flexible members and thereby retaining said front and rear panel portions in generally vertically-extending relation at the respective front and rear of the child for holding the child upright on the swing seat as the seat and child therewith undergo swinging motion.

4,881,781

RESTRAINT BELT LOAD CAPACITY FORE AND AFT POWER SEAT ADJUSTER APPARATUS AND METHOD

Hans J. Borlinghaus, Roseville, and Michael G. Orlowsky, Sterling Heights, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 93,722, Sep. 8, 1987, Pat. No. 4,832,409.
This application Feb. 1, 1989, Ser. No. 304,435
Int. Cl.[4] B60R *22/25*
U.S. Cl. 297—473 5 Claims



1. A vehicle power seat adjuster with an occupant restraint belt connected thereto, said sea adjuster in combination comprising:

an elongated floor channel fixably connected with said vehicle with a flange portion, and said floor channel having a series of notches along a significant length of said floor channel;

an elongated seat channel connected with said seat and slidably mounted on said floor channel with a flange portion interlocked with said flange portion of said floor channel;

an actuator for selectively moving said seat channel on said floor channel and retaining said seat channel position on said floor channel under an imposed load on said seat channel up to a first predetermined amount;

a restraint anchor connected with said seat channel, said anchor providing a means for connection of said belt restraint;

a first lever pivotally connected with said seat channel and angularly biased in a first angular direction; and

a locking lever pivotally connected with said seat channel biased in an angular direction to engage with said notches of said floor channel, said locking lever being held out of engagement with said floor channel notches by contact engagement with said first lever whereby an acceleration of a predetermined value causes said first lever to rotate opposite said first angular direction to disengage from said lock lever to allow said locking lever to engage with said floor channel so that the force retaining said seat channel to said floor channel significantly exceeds the restraining force of said actuator and significantly exceeds the loading imposed on said seat channel by said belt restraint under said predetermined acceleration.

4,881,782

UNLOADING SPOUT FOR GRAIN TRUCKS

Charles A. Gagner, Rte. 1, Box 117, Brooks, Minn. 56715

Filed May 16, 1988, Ser. No. 194,521
Int. Cl.[4] B60P *1/00*
U.S. Cl. 298—7 10 Claims

1. An unloading spout for use with a mobile bin holding discrete flowable material, said bin having at least one upright bin wall provided with an unloading port partially bounded by first and second generally upright, spaced-apart, bin port side edges; said unloading spout including:

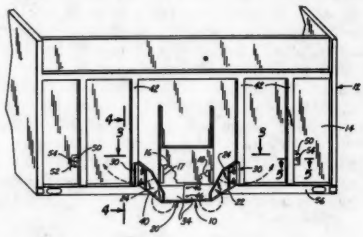
(a) a first spout means including:

(1) a first spout wing partially defined by top, bottom, leading and trailing edges,

(2) first hinge means fastening the trailing edge of said first wing to said upright bin wall adjacent said first upright bin port side edge to pivot on a generally upright axis between an assembled operable position extending outwardly from the bin wall to confine the direction of flow of such material from said port, and a stowed position generally parallel to the bin wall,

(3) a first spout floor partially defined by a leading edge, a trailing edge, an outward edge and an inward edge, and

(4) second hinge means fastening the first spout floor outward edge to the first spout wing bottom edge to pivot between an assembled operable position extending outwardly from the bin wall and in generally normal relation to the first spout wing, and a stowed position wherein the first spout floor is in generally parallel relation to the first spout wing;



(b) first releasable means to retain the first spout wing and first spout floor in said stowed position;

(c) second spout means connected to the bin wall adjacent said second bin port side edge in position to confine the direction of flow of such material from said port; and

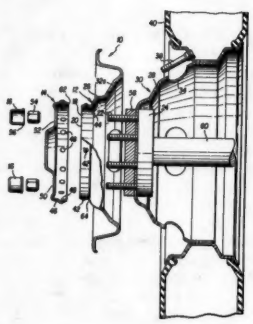
(d) means to support the inward edge of the first spout floor with respect to the second spout means in assembled operable position such that all such material flowing from said unloading port is confined by the second spout means and by the first spout wing and first spout floor of the first spout means to flow from the spout in a predetermined discharge configuration.

4,881,783

WHEEL LINER ASSEMBLY

Joe B. Campbell, 4724 Driver Ct., Virginia Beach, Va. 23462

Filed Jun. 22, 1988, Ser. No. 209,726
Int. Cl.[4] B60B *7/06*
U.S. Cl. 301—37 S 8 Claims



1. A wheel liner assembly of a type for being mounted on a circular, axially-directed, surface of a rotatable wheel hub having a plurality of threaded studs arranged in a cluster thereon on which a load-bearing portion of a vehicle wheel is

clamped by lug nuts which mesh with said threaded studs, said wheel cover assembly comprising:

an annularly-shaped cover member defining a hole in the middle thereof, said hole being larger than said cluster of threaded studs, said annularly-shaped cover member extending radially outwardly for covering a load-bearing portion of a wheel;

a cap member having a plurality of stud holes therein corresponding to the positions of said studs for being placed on said studs and clamped to said load-bearing portion of said vehicle wheel by said lug nuts, said cap member having an outer perimeter diameter that is larger than a diameter of said hole in said annularly-shaped cover member whereby when said annularly-shaped cover member is placed on said wheel hub and said cap member is clamped to said hub by said lug nuts it impinges on said annularly-shaped cover member and, in turn, clamps said annularly-shaped cover member to said load-bearing portion of said vehicle wheel;

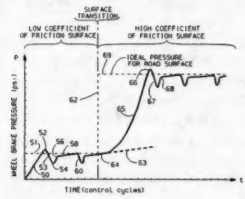
wherein, is further included on said cap member, at said outer perimeter thereof, and on said annularly-shaped cover member, at said hole thereof, interlocking engaging means for enabling these two members to be snapped together in various rotative orientations one to the other so that these two members can be snapped together and mounted on the hub as one piece.

4,881,784

ABS PRESSURE APPLY ALGORITHM

Kevin G. Leppek, West Bloomfield, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 3, 1989, Ser. No. 305,574
Int. Cl.[4] B60T *8/58*
U.S. Cl. 303—100 **3 Claims**



1. A method of limiting the brake pressure applied to the brake of a wheel traveling over a road surface to limit wheel slip between the wheel and the road surface, the method comprising the steps of:

(a) detecting an incipient wheel lock condition resulting from the value of slip between the wheel and road surface exceeding a critical slip value;

(b) storing a value representative of the brake pressure at which the incipient wheel lock condition is initiated;

(c) lowering the brake pressure in response to the detected incipient wheel lock condition to allow the wheel to recover from the incipient wheel lock condition;

(d) re-establishing brake pressure following wheel recovery to a value that is a predetermined fraction of the brake pressure represented by the stored value; and

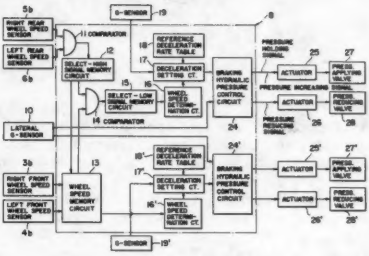
(e) ramping the brake pressure until an incipient wheel lock condition is again sensed at step (a), the brake pressure being ramped (1) at a first rate when the brake pressure is less than the pressure represented by the stored value and (2) at a second rate greater than the first rate when the brake pressure is greater than the pressure represented by the stored value, the second rate providing for a rapid increase in the brake pressure from the pressure corresponding to the stored value in response to an increase in the friction coefficient between the wheel and the road surface.

4,881,785

ANTI-LOCK BRAKE CONTROL METHOD AND SYSTEM FOR MOTOR VEHICLES

Takayaki Ushijima; Katsumasa Igarashi, and Seiichi Ishizeki, all of Tokyo, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 9, 1989, Ser. No. 308,135
Claims priority, application Japan, Feb. 9, 1988, 63-27946
Int. Cl.[4] B60T *8/84*
U.S. Cl. 303—111 **4 Claims**



1. An anti-lock brake control method for a motor vehicle having an anti-lock brake control system which has a diagonally disposed dual hydraulic line system and which accomplishes the control of braking hydraulic pressure for braking the wheels of the vehicle, by repeating a control pattern in which during braking the lower one of the wheel speeds of the two wheels connected to the same hydraulic line is selected as a control speed and in which, in response to variations of said control speed, the braking hydraulic pressure in the same hydraulic line is reduced and then increased, said method comprising the steps of:

providing detection means for detecting a J-turn braking state of the vehicle;

selecting a higher one of the wheel speeds of left and right rear wheels when said detection means detects the J-turn braking;

selecting a lower one of the wheel speeds of two wheels connected to one hydraulic line to which the rear wheel having said selected higher wheel speed belongs, as a control speed to be applied to said one hydraulic line;

selecting the wheel speed of a front wheel connected to the other hydraulic line as a control speed to be applied to said other hydraulic line; and

controlling the braking hydraulic pressures in accordance with the selected speeds, when the detection means detects the J-turn braking state, in order to stop the vehicle without skidding in a predetermined pattern.

4,881,786

TENSIONING AND RECOIL SYSTEM FOR A TRACKED VEHICLE

Andrew J. Tonsor, East Peoria, Ill., assignor to Caterpillar Inc., Peoria, Ill.

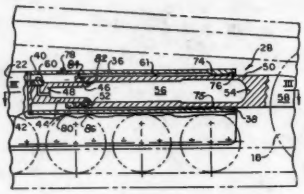
Filed Jul. 21, 1988, Ser. No. 222,685
Int. Cl.[4] B62D *55/30*
U.S. Cl. 305—10 **9 Claims**

1. A tensioning and recoil system for controllably resisting linear movement of a track guiding wheel of a track type vehicle comprising:

a frame member having a cylinder, said cylinder having a first open end portion and a second closed end portion having an end wall;

a piston having a first open end portion and a second closed end portion and being positioned within said cylinder, said second end portion being in contact with said cylinder end wall;

a recoil tube having a first open end portion and a second closed end portion, said recoil tube being positioned within said cylinder with said first open end portion telescopically receiving said piston first end portion and said



second closed end portion extending outwardly of said frame cylinder, said piston and said recoil tube forming a single sealed and closed chamber, said chamber adapted to receive a compressible gas;

a wheel support member joined to said recoil tube second end portion and adapted to rotatably support said track guiding wheel; and

valve means for charging and discharging gas into and out of said closed chamber.

4,881,787

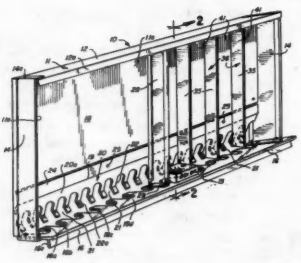
PACKAGE STORAGE, DISPLAY AND DISPENSING APPARATUS

Michael King, Glen Ellyn, and Homer F. King, Oakbrook, both of Ill., assignors to H. King and Associates, Bensenville, Ill.

Filed Aug. 5, 1987, Ser. No. 81,864

Int. Cl.[4] A47F *1/00*

U.S. Cl. 312—42 **7 Claims**



1. An apparatus for storage, display and dispensing of regularly shaped packages which comprises a tray of generally box-like shape open at the top having generally rectangular front and rear walls and a pair of spaced apart parallel side walls each connected to and extending between the ends of said front and rear walls at essentially right angles thereto, said front wall being formed of transparent material having a plurality of U-shaped finger-way notches open toward the bottom formed therein, a partial bottom wall defining a package support surface extending between the side walls and from the rear wall to a front edge point spaced from the rear surface of said front wall to form a product removal aperture between the front edge of the bottom wall and the rear surface of said front wall, and means including a plurality of flexible finger means affixed to and extending from the front edge of the bottom wall and partially across said product removal aperture and towards said finger notches to contact and secure packages stored in said apparatus, said notches providing finger access to packages stored in said apparatus, which packages may be removed by deformation of the flexible finger means.

4,881,788

APPARATUS AND METHODS FOR PROCESSING OPTICAL SIGNAL WITH WAVEGUIDES EXHIBITING SOLITON EFFECTS

Nicholas J. Doran, Cambridge, England, assignor to British Telecommunications, plc, London, United Kingdom

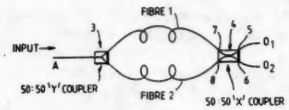
PCT No. PCT/GB87/00740, § 371 Date Jun. 20, 1988, § 102(e) Date Jun. 20, 1988, PCT Pub. No. WO88/02876, PCT Pub. Date Apr. 21, 1988

PCT Filed Oct. 20, 1987, Ser. No. 209,477

Claims priority, application United Kingdom, Oct. 20, 1986, 8625088; Oct. 22, 1986, 8625281; Jul. 22, 1987, 8717376

Int. Cl.[4] G02B *6/26*

U.S. Cl. 350—96.15 **11 Claims**



1. An optical device comprising first coupling means having at least one input port and two output ports and second coupling means having at least one output port and two input ports, each coupling means having a predetermined coupling ratio from input to output, and first and second optical waveguides connecting each output of the first coupling means with a corresponding input of the second coupling means, the waveguides comprising material which supports soliton effects when optical pulses at appropriate working intensities are injected into the waveguides, the first and second waveguides defining respective optical paths with substantially the same optical length, the length being sufficient for the intensity dependent phase of an injected pulse to be substantially uniform throughout the pulse, whereby portions of an optical pulse received at the input port of the first coupling means are coupled into the waveguides by the first coupling means and arrive synchronously but with an intensity dependent relative phase shift at the second coupling means after travelling along the waveguides.

4,881,789

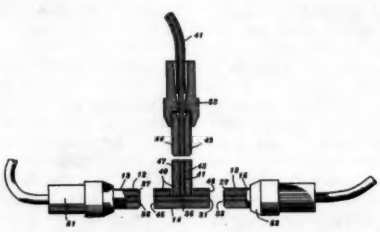
INTEGRATED OPTICAL COUPLER AND CONNECTOR

Frank H. Levinson, San Mateo County, Calif., assignor to Finisar Corporation, Menlo Park, Calif.

Filed May 26, 1988, Ser. No. 198,979

Int. Cl.[4] G02B *6/26*

U.S. Cl. 350—96.15 **4 Claims**



1. An optical fiber coupler comprising:

three separate ferrules formed from a continuous glass capillary tube having a capillary bore of suitable diameter for receiving optical fibers; said three ferrules including first and second end ferrules and a middle ferrule, said middle ferrule having a removed window portion exposing a portion of its capillary bore and two ferrule coupling ends on both sides of said removed window portion;

an optical fiber mounted in the capillary bore of the middle ferrule;

beamsplitter means inserted in said optical fiber at a position exposed by said removed window portion of said middle ferrule;

an optical element coupled to the window portion of said middle ferrule so as to be in optical communication with said beamsplitter means; and

coupling alignment means for coupling and aligning said two ferrule coupling ends of said middle ferrule to said first and second end ferrules when optical fibers are mounted in said first and second end ferrules.

4,881,790

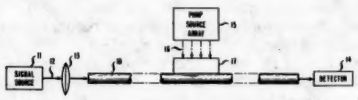
OPTICAL COMMUNICATIONS SYSTEM COMPRISING RAMAN AMPLIFICATION MEANS

Linn F. Mollenauer, Colts Neck, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 25, 1988, Ser. No. 185,573

Int. Cl.[4] G02B *6/28*

U.S. Cl. 350—96.16 **13 Claims**



1. An optical fiber communications system with Raman amplification, the system comprising

first means for generating first electromagnetic radiation of wavelength λ_0, a length of polarization maintaining optical fiber having a core and a cladding, detector means for detecting the first radiation, and means for coupling the first radiation into the optical fiber at a first fiber location, the coupled-in first radiation guided in the fiber to a second fiber location that is spaced apart from the first fiber location, at least some of the coupled-in first radiation emitted from the fiber at the second fiber location and detected by the detector means;

second means for generating second electromagnetic radiation in a predetermined polarization related to a desired signal polarization mode for the first radiation in the polarization maintaining optical fiber, associated with the second radiation being a second radiation spectrum;

means for coupling the second radiation into the polarization maintaining optical fiber at a third fiber location that is intermediate the first and the second fiber locations, said means for coupling causing said second radiation to propagate in a direction opposite to that of said first radiation in said polarization maintaining optical fiber; and

the second means comprises a second radiation source selected to result in a second radiation spectrum having a width greater than the Brillouin linewidth of the optical fiber, and further selected such that the intensity of second radiation in the fiber at any wavelength λ_p is less than a critical intensity I_c.

4,881,791

OPTICAL DEVICE

Stephen R. Mallinson, Ipswich, and Colin A. Millar, Felixstowe, both of England, assignors to British Telecommunications Public Limited Company, Great Britain

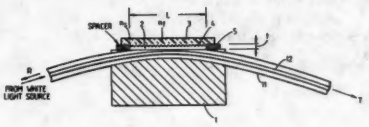
PCT No. PCT/GB88/00333, § 371 Date Dec. 19, 1988, § 102(e) Date Dec. 19, 1988, PCT Pub. No. WO88/08548, PCT Pub. Date Nov. 3, 1988

PCT Filed Apr. 28, 1988, Ser. No. 288,036

Claims priority, application United Kingdom, Apr. 28, 1987, 8710067

Int. Cl.[4] G02B *6/34*

U.S. Cl. 350—96.19 **11 Claims**



1. An optical device comprising an optical waveguide underlying a first layer of material which has a refractive index higher than the effective refractive index of the waveguide and which forms a planar waveguide capable of supporting and guiding at least one propagation mode of a higher order than, but matching the phase velocity of, the propagation mode or modes in the underlying waveguide; and a diffraction grating provided on or adjacent to a least one surface of the first layer, the arrangement being such that an optical signal which is coupled from the waveguide into the first layer impinges on the diffraction grating and is coupled back to the waveguide.

4,881,792

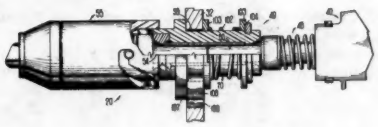
SELF-ADJUSTING OPTICAL FIBER CONNECTOR ASSEMBLY

George M. Alameel, Duluth, and Rodney W. Hammond, Norcross, both of Ga., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Mar. 31, 1988, Ser. No. 175,719

Int. Cl.[4] G02B *6/36*

U.S. Cl. 350—96.20 **13 Claims**



1. A coupling which is adapted to be mounted in a panel, said coupling comprising:

a housing comprising first and second end portions, each said end portion being adapted to receive a plug which terminates an optical fiber;

a sleeve which is disposed in said housing, recessed from at least the second end portion thereof and adapted to receive in each end portion thereof a plug which terminates an optical fiber, said housing having an entrance to said second end portion thereof which is tapered from a large diameter portion at the entrance to a small diameter portion adjacent to said sleeve with said small diameter portion having a transverse cross section which is equal at least to the transverse cross-section defined by an inner diameter of said sleeve; and

mounting means for supporting said housing in an opening of a panel in such a manner as to permit movement in any one or more of three dimensions as a plug is inserted into

said second end portion of said housing, said mounting means cooperating with a diameter-to-length ratio of the small diameter portion of said housing which is adjacent to said sleeve to minimize any turning movement of said coupling about an axis transverse to its longitudinal axis and cause any movement of said coupling during insertion of a plug into said second end portion to be substantially translatory with respect to the longitudinal axis.

4,881,793

OPTICAL FIBRE ATTENUATORS AND METHOD FOR MAKING SAME

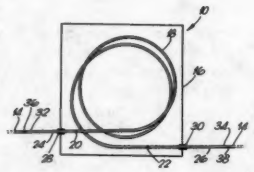
Eleanor J. Tarbox, Southampton, England, assignor to Pirelli General plc, London, England

Filed May 24, 1988, Ser. No. 198,145

Claims priority, application United Kingdom, Jun. 4, 1987, 8713081

Int. Cl.[4] G02B 6/38; C03C 25/02

U.S. Cl. 350—96.21 16 Claims



1. An attenuating device (10,12) for use with single mode signal carrying optical fibres (14), said device comprising a length (18) of single mode optical fibre having a core provided with a dopant comprising a vapour deposited variable valency element which is present for at least part of a lower valence state whereby said core of the optical fibre of the device is of higher attenuation per unit length than the signal carrying fibres with which the device is intended to be used, and means (24,26; 44,46) for optically connecting the opposite ends of said length of optical fibre to signal carrying optical fibres.

4,881,794

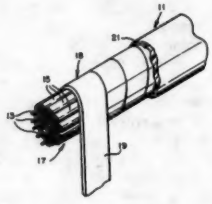
LOW SMOKE AND REDUCED FLAME FLUORINATED POLYMER COMPOSITIONS AND CABLE CONSTRUCTIONS

Edward J. Bartoszek, Jeffersonville, Pa., assignor to Pennwalt Corporation, Philadelphia, Pa.

Division of Ser. No. 847,351, Apr. 2, 1986, Pat. No. 4,804,702. This application Aug. 25, 1988, Ser. No. 236,564

Int. Cl.[4] G02B 6/44

U.S. Cl. 350—96.23 5 Claims



1. A low smoke and flame retardant cable comprising a bundle of electrical conductors or fiber optic strands encased in a polymer jacket which comprises a vinylidene fluoride polymer composition having dispersed therein from about 0.2 to about 1.2 percent by weight of said composition of aluminum silicate selected from calcined or hydrated aluminum silicate consisting essentially of Al_2O_3. $2SiO_2$. nH_2O wherein n =0 to 2.

4,881,795

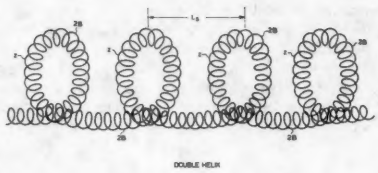
HIGH COUNT OPTICAL FIBER DISTRIBUTION CABLE

Susan M. Cooper, Newton, N.C., assignor to Siecor Corporation, Hickory, N.C.

Filed Feb. 3, 1989, Ser. No. 305,703

Int. Cl.[4] G02B 6/44

U.S. Cl. 350—96.23 11 Claims



1. A high count optical fiber distribution cable having optical fiber attenuation stability over a range of temperatures comprising:

(a) A center sub-unit comprising a sub-unit center strength member and at least one buffer tube stranded about said center sub-unit forming a single helix, said center strength member having a tensile strength of at least 4,350,000 psi and a coefficient of thermal expansion of no more than 25×10^{6} Cm/Cm/°C.;

(b) one or more additional sub-units stranded about the center sub-unit each additional sub-unit comprising at least one buffer tube stranded in a double helix configuration and a sub-unit strength member, each buffer tube stranded about said sub-unit strength member and each sub-unit strength member having a tensile strength of at least 4,350,000 psi and a coefficient of thermal expansion of no more than 25×10^{6} Cm/Cm/°C.; and,

(c) 300 or more elongated optical fibers, in one or more of said buffer tubes, that vary no more than 0.2 db/km in attenuation when said high count optical fiber distribution cable is subjected to temperatures between −40° and 70° C. at wavelengths of 1310 nm and 1550 nm.

4,881,796

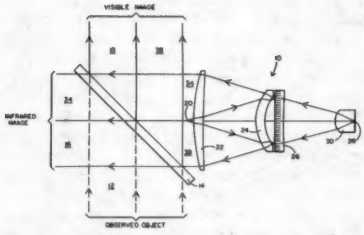
SINGLE-APERTURE MULTI-SPECTRAL RETICLE PROJECTOR

David Michika, Santa Ana, and Robert J. Brown, Tustin, both of Calif., assignors to Ford Aerospace Corporation, Newport Beach, Calif.

Filed Aug. 8, 1988, Ser. No. 229,592

Int. Cl.[4] G02B 5/18

U.S. Cl. 350—166 4 Claims



1. A single aperture multi-spectral reticle projector, comprising:

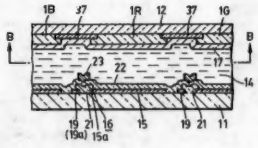
(a) first and second reticles;
(b) first illumination means for illuminating said first reticle with light of a first wavelength;
(c) second illumination means for illuminating said second reticle with light of a second wavelength; and
(d) a dichroic lens interposed between said reticles coaxially therewith, said dichroic lens being reflective at said first wavelength but transparent at said second wavelength;
(e) collimating lens means interposed coaxially between said first reticle and said dichroic lens for refracting the image of said first reticle on a passage therethrough and collimating said image on a second passage therethrough;
whereby collimated images of said first and second reticles are projected coaxially in the same direction by said dichroic lens.

4,881,797

COLOR LIQUID CRYSTAL DISPLAY DEVICE

Shigeo Aoki, Habikino; Katsumi Miyake, Nara, and Yasuhiro Ugai, Yao, all of Japan, assignors to Hosiden Electronics Ltd., Osaka, Japan

Continuation of Ser. No. 812,887, Dec. 4, 1985, abandoned. This application Aug. 16, 1988, Ser. No. 232,514
Claims priority, application Japan, Apr. 20, 1984, 59-103
Int. Cl.[4] G02F *1/133, 1/137*
U.S. Cl. 350—339 F **3 Claims**



1. A color liquid crystal display device comprising first and second transparent substrates spaced apart a small distance and facing each other, a liquid crystal sealed between said two transparent substrates, a plurality of transparent display electodes provided on the inner side surface of said first transparent substrate, thin film transistors formed on said first transparent substrate and each connected to each of said display electrodes, a transparent common electrode formed substantially on the entire inner side surface of said second transparent substrate, and color filters each facing each of said display electrodes, the improvement wherein:

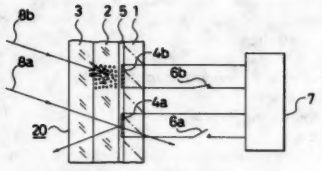
said color filters are separated from one another by a gap which is defined between the opposing side edges of adjacent ones of said color filters, each gap between adjacent ones of said color filters being closed by a metal layer capable of blocking light, said light-blocking layers being formed on said second substrate and having marginal edges underlying the marginal edges of said color filters, and said common electrode extending over and in contact with said color filters and with portions of said light-blocking layers between said color filters.

4,881,798

THERMAL OPTICAL MODULATION METHOD AND DEVICE USING ALTERNATING CURRENT

Satoshi Yuasa; Hirohide Munakata, both of Yokohama; Yoko Yoshinaga, Machida; Masahiro Haruta, Tokyo, and Yukuo Nishimura, Sagamihara, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 895,472, Aug. 11, 1986, abandoned. This application Apr. 14, 1989, Ser. No. 338,424
Claims priority, application Japan, Aug. 13, 1985, 60-176847; Aug. 13, 1985, 60-176848
Int. Cl.[4] G02F *1/01, 1/17*
U.S. Cl. 350—353 **9 Claims**



1. An optical modulating device comprising a heat-sensitive medium containing a polymeric substance and a liquid;

a heat-generating resistor

a protecting layer provided between said heat-sensitive medium and said heat-generating resistor; and

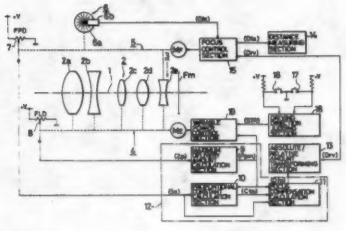
means for supplying an alternating electric current with a frequency of 200 to 800 Hz to said heat-generating resistor for heating said heat-sensitive medium.

4,881,799

VARIFOCAL LENS DEVICE

Yoshimi Ohno, Kawasaki; Takayuki Hatase, Yokohama, and Daisuke Hata, Funabashi, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Apr. 20, 1988, Ser. No. 184,023
Claims priority, application Japan, Apr. 20, 1987, 62-95047; May 23, 1987, 62-125021; May 30, 1987, 62-133402; May 30, 1987, 62-133404; May 30, 1987, 62-135696
Int. Cl.[4] G02B *15/00*
U.S. Cl. 350—429 **14 Claims**



1. A varifocal lens device provided with a variable power optical system composed of a variable power lens group and a focusing lens group which is a part of said variable power lens group disposed on an optical axis for compensating a deviation produced in the image forming position for an object when said focusing lens group is set at a focusing position between the nearest possible position and the infinitely far position on the optical axis corresponding to an object distance falling between the shortest possible distance and the infinitely long distance and then an overall focal length of said variable power optical system is subsequently renewed from a first to a second

focal length selected freely between the shortest possible focal length and the longest possible focal length by means of said variable power lens group, said device comprising:

a first driving means for driving said variable power lens group;

a second driving means for driving said focusing lens group;

a first detecting means for detecting the absolute positions of said variable power lens group on the optical axis;

a calculating means for receiving the information on the focal length and the position of said focusing lens group from said first detecting means and, based on the received information, for calculating an absolute amount of compensation of focal length necessary for the elimination of the deviation in the image forming position;

a transforming means for transforming a compensated focal position as an obsolete amount into the amount of movement as a relative amount;

a second detecting means for detecting the amount of movement of said focusing lens group on the optical axis as a relative amount;

a first controlling means for controlling said first driving means; and

a second controlling means for receiving the data on distance measurement issued as an absolute amount from measuring means separately installed for measuring the distance to an object or for receiving the output of said transforming means and, based on the data or the output so received and in accordance with the output of second detecting means, for controlling said second driving means so as to drive said focusing lens group to an estimated focal position for the object or to the compensated focal position.

4,881,800

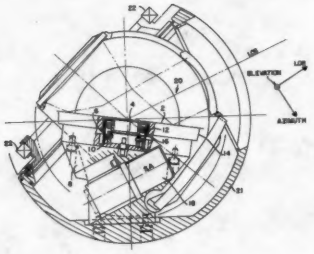
TWO-AXIS MIRROR STABILIZATION ASSEMBLY

Charles R. Fuchs, Wayne; David A. Haessig, Jr., Towaco; David L. Heckathorn, Wayne; Jordan S. Kass, Wayne; Peter Lindsay, Hardyston Township, Sussex County, and Joseph J. Volpe, Rockaway, all of N.J., assignors to Plessey Electronic Systems Corp., Wayne, N.J.

Filed May 16, 1988, Ser. No. 194,367

Int. Cl.[4] G02B *27/64*

U.S. Cl. 350—500 **17 Claims**



1. In an optical stabilizing system having an assembly for tracking a command line of sight and rejecting environmental perturbations, the line of sight being chosen in accordance with an input command signal, the assembly comprising:

a mirror;

a rigid block;

means flexibly coupling the mirror to the rigid block, the flexible coupling means providing two axes of freedom for the mirror;

gyroscopic means mounted to the rigid block, the spin axis of the gyroscopic means being aligned along the line of sight, the gyroscopic means providing a gyro rate signal about two axes perpendicular to the line of sight;

means for torquing the mirror;

means for sensing the movement of the mirror and providing a feedback pickoff signal corresponding thereto; and

control means for receiving the command signal, the gyro rate signal and the feedback pickoff signal and, based on these signals, providing a torquer signal to the torquing means for torquing the mirror; whereby the torquer signal is responsive for cancelling the environmental perturbations and torques the mirror only to track the command line of sight.

4,881,801

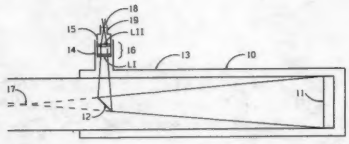
FAST, ABERRATION-FREE FLAT FIELD CATADIOPTRIC TELESCOPE

Rolin J. Gebelein, 291 Martin Rd., Santa Cruz, Calif. 95960

Continuation-in-part of Ser. No. 782,286, Sep. 30, 1985, Pat. No. 4,718,753, which is a continuation-in-part of Ser. No. 660,916, Oct. 15, 1984, Pat. No. 4,571,036, Division of Ser. No. 316,134, Nov. 22, 1981, Pat. No. 4,477,156. This application Jan. 11, 1988, Ser. No. 142,539

Int. Cl.[4] G02B *17/08*

U.S. Cl. 350—503 **10 Claims**



1. A Catadioptric Telescope that is fast and has an aberration free flat field, comprising:

a spherical primary mirror for an objective; and

corrector means, proximate to the focus of the objective, wherein the corrector means is comprised of a plano concave first element, or near-plano concave first element, with its concavity facing converging light reflected from the objective and said first element being positioned such that the converging light will be collimated or nearly collimated upon existing the first element to impinge upon a plano convex second element, or near-plano convex second element, which has been reversed from a split meniscus type of configuration so that the collimated light first strikes the convex surface of this second element, such reversal resulting in a substantial reduction of negative spherical aberration due to this second element, but the significant optical power of this second element is not changed, said corrector arranged such that light exits the plano, or near-plano surface of the second element and is directed toward a focus.

4,881,802

COMBINED BRIGHT FIELD-DARK FIELD INCIDENT LIGHT ILLUMINATION APPARATUS

H. W. Stankewitz, Wetzlar, Fed. Rep. of Germany, assignor to Ernst Leitz Wetzlar GmbH, Wetzlar, Fed. Rep. of Germany

Filed May 3, 1988, Ser. No. 189,546

Claims priority, application Fed. Rep. of Germany, May 5, 1987, 3714830

Int. Cl.[4] G02B *21/10, 26/02, 21/12*

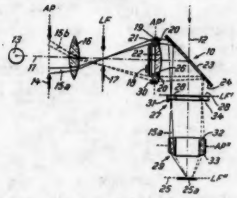
U.S. Cl. 350—525 **26 Claims**

1. A combined bright field-dark field incident light illumination apparatus suitable for microscope instruments having an object plane, comprising:

means, including a light source, for producing an illuminating beam including a bright field ray bundle and a generally annular dark field ray bundle, said illuminating beam

having a uniformly illuminated area at a point along its axis;

means for selectively suppressing the bright field ray bundle; and



means for projecting the uniformly illuminated area into the object plane via at least one intermediate image formed in the dark field ray bundle, said projecting means comprising at least three annular optical elements positioned in the dark field ray bundle.

4,881,803

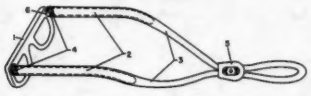
ORNAMENTAL SUNGLASSES RETAINER

Conley W. Giles, 603 W. 13th, No. 292, Austin, Tex. 78701; Karen L. Teare, P.O. Box 1-A-157, 603 W. 13th, Austin, Tex. 78701, and R. Peyton Wimmer, 1930 West Rundberg, Austin, Tex. 78758

Continuation-in-part of Ser. No. 874,137, Jun. 13, 1986, abandoned. This application Apr. 22, 1988, Ser. No. 184,892

Int. Cl.[4] G02C *3/02*

U.S. Cl. 351—156 **9 Claims**



1. A sunglasses retainer comprising:

A. a stretchable fabric tube to fit snugly over temple pieces of said sunglasses and to constrict into and be frictionally held by hinges of said temple pieces,

B. a resilient treating material in the interstices of the fibers in that portion of each end of said stretchable fabric tube that will constrict into said hinges,

C. a manually adjustable friction catch holding means to slideably engage said stretchable fabric tube when each of said ends is threaded through said holdings means said manually adjustable friction catch holding means comprising a manually adjustable circular corrugated member, moveable in a housing that narrows at one end, thereby frictionally holding said stretchable fabric tube increasingly tighter when said manually adjustable friction catch holding means is adjusted to a desired position and tension is applied to said stretchable fabric tube extending from said one end of said housing.

4,881,804

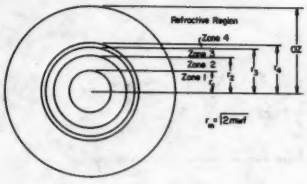
MULTIFOCAL PHASE PLATE WITH A PURE REFRACTIVE PORTION

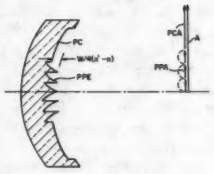
Allen L. Cohen, 10010 Walsham Ct., Richmond, Va. 23233

Filed Nov. 12, 1987, Ser. No. 120,265

Int. Cl.[4] G02C *7/04*; G02B *5/18, 27/44*

U.S. Cl. 351—161 **34 Claims**





1. An ophthalmic contact lens with a phase plate and a pure refractive portion within its optic zone.

4,881,805

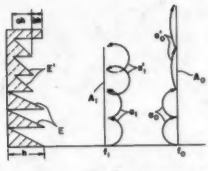
PROGRESSIVE INTENSITY PHASE BIFOCAL

Allen L. Cohen, 10010 Walsham Ct., Richmond, Va. 23233

Filed Nov. 12, 1987, Ser. No. 120,262

Int. Cl.[4] G02C *7/04*; G02B *5/18, 27/44*; A61F *2/16*

U.S. Cl. 351—161 **17 Claims**

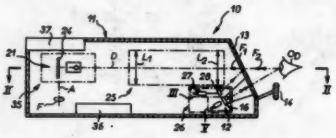


1. An ophthalmic contact or intraocular lens containing more than one phase plate within its optic zone.

4,881,806
AUTOMATIC INTERPUPILLARY DISTANCE MEASURING DEVICE

Christian Bovet, Paris, France, assignor to Essilor International Cie Generale d'Optique, Creteil Cedex, France

Filed Jul. 26, 1988, Ser. No. 224,145
Claims priority, application France, Jul. 30, 1987, 87 10804
Int. Cl.[4] A61B 3/10
U.S. Cl. 351—204 26 Claims

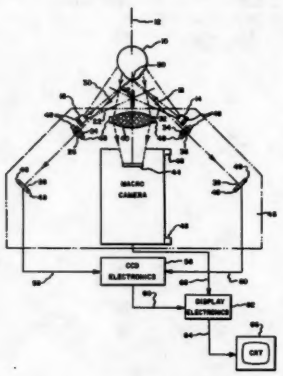


1. Automatic interpupillary distance measuring device, comprising a light source adapted to produce a reflection or reflections on the cornea of at least one eye of a person, a sensor receiver, a scanning device for scanning said sensor receiver transversely to a general direction of observation of the person so as to direct onto said receiver the light rays corresponding to said corneal reflection or reflections, a slit disposed optically between the scanning device and the sensor receiver and providing access to the sensor receiver, and means for producing in said sensor receiver a measurement reference mark relative to which the position of the corneal relection or reflections can be determined.

4,881,807
OPTICAL ALIGNMENT SYSTEM

David A. Luce, Clarence Center, and Srdjan Krstanovic, Kenmore, both of N.Y., assignors to Cambridge Instruments, Inc., Cheektowaga, N.Y.

Filed Aug. 5, 1988, Ser. No. 228,482
Int. Cl.[4] A61B 3/14
U.S. Cl. 351—208 27 Claims



1. An alignment system for an ophthalmic instrument comprising,

(a) illuminating means for illuminating an eye with diverging rays from a light source,

(b) a first detecting means for defining a first light detecting area, said light detecting means including a first pinhole occluder to pass a small bundle of reflected rays producing a first signal identifying the XY location of reflected light on said first area,

(c) a second detecting means for defining a second light detecting area, said second detecting means including a second pinhole occluder to pass a small bundle of reflected rays and producing a second signal identifying the XY location of reflected light on said second area,

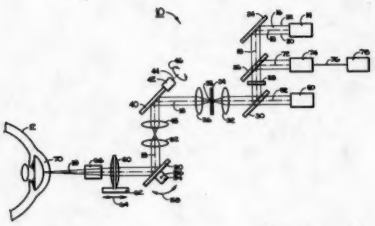
(d) means evaluating said first and second signals for providing a third signal, and

(e) means for selectively positioning the instrument relative to the eye responsive to said third signal.

4,881,808
IMAGING SYSTEM FOR SURGICAL LASERS

Josef F. Bille, Solana Beach, and Stuart I. Brown, La Jolla, both of Calif., assignors to Intelligent Surgical Lasers, La Jolla, Calif.

Filed Feb. 10, 1988, Ser. No. 154,966
Int. Cl.[4] A61B 3/10
U.S. Cl. 351—221 17 Claims



1. An ocular imaging system for determining the location of an interface between media having different indices of refraction which comprises:

a light source for radiating a beam;

a pin hole aperture positioned along said beam;

means for focusing said beam confocally with said aperture; and

monitoring means responsive to the intensity of light that is specularly reflected through said aperture to indicate when said beam is focused on said interface.

4,881,809
METHOD AND DEVICE FOR MEASURING DISTANCE OPTICALLY

Bomer Thierry, Paris, France, assignor to Matra, Paris, France

Filed Jul. 14, 1987, Ser. No. 73,187
Claims priority, application France, Jul. 22, 1986, 86 10621
Int. Cl.[4] G01C 3/08
U.S. Cl. 356—5 8 Claims

1. Optical process for measurement of a distance between a hunter and a target, comprising the steps of:

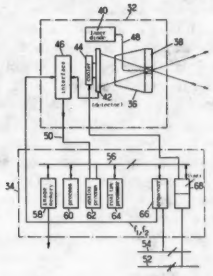
(a) sending substantially monochromatic light pulses from the hunter toward the target;

(b) collecting light echoed by the target on a matrix detector having photosensitive sites distributed in lines and columns with line-by-line transfer read-out

(c) carrying out said transfer read-out in the direction of the columns at a first predetermined frequency during the time of flight between sending and return of the reflected echo from said target;

(d) repeating the sequence of steps (a), (b) and (c) with

another predetermined transfer frequency, different from the first frequency; and



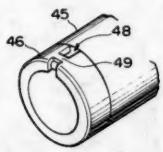
(e) deriving the distance from the distance between lines of the matrix having received the echo for the two different frequencies.

4,881,810

ENDOSCOPE WITH A REMOVABLE COVER MEMBER

Hiroshi Hasegawa, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Nov. 9, 1987, Ser. No. 118,068
Claims priority, application Japan, Nov. 10, 1986, 61-267258
Int. Cl.[4] G02B *23/26*
U.S. Cl. 356—241 **14 Claims**



1. An endoscope comprising:

an elongated tubular part for observing an object, said elongated tubular part having a rigid tip body at a tip part thereof;

at least one tubular outer cover slidably positioned around the outer periphery of said elongated tubular part; and

a removable cylindrical cover member firmly self-secured around said rigid tip body for retaining said at least one tubular outer cover, said cover member being provided with at least one substantially through slit along the longitudinal axis thereof, wherein said cover member is removed from said rigid tip body by forcibly expanding said slit in order to further remove said at least one tubular cover from said elongated tubular part.

4,881,811

REMOTE COLOR MEASUREMENT DEVICE

John K. O'Brien, Sudbury, Mass., assignor to Colorgen, Inc., Billerica, Mass.

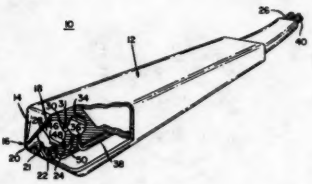
Filed Feb. 16, 1988, Ser. No. 156,471
Int. Cl.[4] G01J *3/02, 3/08*
U.S. Cl. 356—323 **22 Claims**

1. A probe, for use with a spectrophotometer, for sensing the reflectance of a sample remote from the spectrophotometer, comprising:

A probe housing having a probe portion positionable proximate the sample;

an integrating chamber for diffusing radiation disposed within said probe housing and having a radiation input port for providing radiation to said integrating chamber, a sample port for passing diffused radiation to the sample and returning reflected radiation from the sample, a reference port for receiving diffused radiation directly from the chamber, and an exit port to receive radiation reflected from the sample through said sample port;

an output port for receiving reflected sample radiation from said sample and diffused radiation directly from the chamber and for transmitting the received radiation to the remote spectrophotometer;



a guide for directing radiation to said radiation input port from a radiation source; and

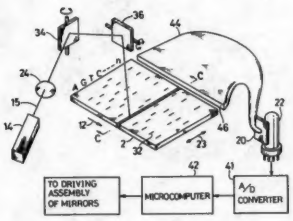
means for selectively directing the diffused radiation from the chamber through said reference port and the radiation reflected from the sample through said exit port to said output port.

4,881,812

APPARATUS FOR DETERMINING BASE SEQUENCE

Kunihiko Ohkubo, Moriyama, and Hidehiko Fujii, Kyoto, both of Japan, assignors to Shimadzu Corporation, Kyoto, Japan

Filed Dec. 7, 1987, Ser. No. 129,295
Claims priority, application Japan, Mar. 31, 1987, 62-80390
Int. Cl.[4] B01D *57/02;* G01N *27/26*
U.S. Cl. 356—344 **10 Claims**



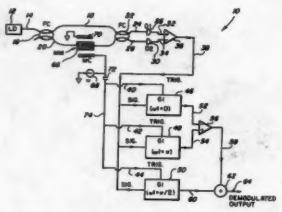
1. An apparatus for determining a base sequence comprising an assembly for making an exciting beam incident on a surface of a slab of electrophoretic gel in a direction normal to said surface, the gel containing nucleic acid fragments labeled with a labeling pigment and developed or being developed therein by electrophoresis; means for concentrating said exciting beam on said gel; means for scanning said surface of said gel with said exciting beam; and a light receiving unit for receiving at an end face of said gel the luminescence emitted by said labeling pigment on the fragments developed in said gel.

4,881,813

PASSIVE STABILIZATION OF A FIBER OPTIC NONLINEAR INTERFEROMETRIC SENSOR

Kee P. Koo, Alexandria, Va.; Frank Bucholtz, Crofton, Md., and Anthony Dandridge, Alexandria, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 20, 1988, Ser. No. 196,705
Int. Cl.[4] G01B 9/02
U.S. Cl. 356—345 **17 Claims**



12. A technique for removing spurious modulation from an intended signal to passively stabilize an output signal from a nonlinear sensor to reduce spurious modulation from said output signal, comprising the steps of:

triggering gated integrators to sample the output signal at times $t=0$, π/ω, and $\pi/2\omega$during an oscillation signal applied to the sensor to obtain samples of the output signal;

subtracting the samples of the output signal taken when time $t=\pi/\omega$and when time $t=0$ to obtain a difference signal; and

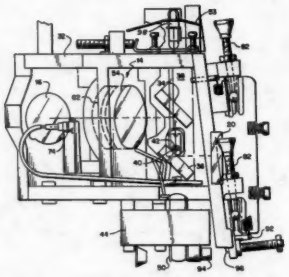
dividing the difference signal by the sample of the output signal taken at time $t=\pi/2\omega$to produce a passively stabilized output signal.

4,881,814

SCANNING MICHELSON INTERFEROMETER ASSEMBLY

Robert A. Hoult, Bethel, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Sep. 2, 1988, Ser. No. 239,871
Int. Cl.[4] G01B 9/02; G01J 3/45
U.S. Cl. 356—346 **16 Claims**



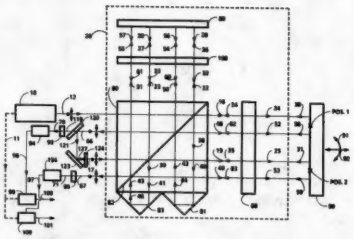
1. A scanning Michelson type interferometer assembly comprising, in combination: a beam splitter assembly for receiving a beam of radiation from a source, a stationary plane mirror for receiving and returning a first subbeam over a fixed length optical path from said beam splitter assembly, an adjustable plane mirror for receiving and returning a second subbeam over a variable length optical path from said beam splitter assembly, means for receiving a combined output beam from said beam splitter assembly for forming a spectrum of the input beam radiation, an optical path difference generator assembly mounted in said second subbeam path between said beam splitter assembly and said adjustable plane mirror, said optical path difference generator assembly having a pair of parallel spaced mirrors mounted so that said second subbeam is incident on one mirror and is reflected by both of said parallel mirrors to emerge from the generator assembly in a direction substantially parallel to the direction of incidence on the one mirror, drive means for rotating said generator assembly about an axis of rotation so as to change the angle of incidence of the second subbeam on said one mirror and thereby vary the optical path length of the second subbeam, said beam splitter assembly and said stationary plane mirror and said adjustable plane mirror and said optical path difference generator assembly being mounted on a monolithic structural frame, means for adjusting said adjustable plane mirror including means interposed between said monolithic structural frame and said adjustable plane mirror forming a tapered track therebetween, ball means mounted for sliding movement in said track, and differential screw means connected to said ball means for driving said ball in said track, thereby to adjust the tilt of said adjustable plane mirror to make it perpendicular to the second subbeam exiting the optical path difference generator assembly.

4,881,815

LINEAR AND ANGULAR DISPLACEMENT MEASURING INTERFEROMETER

Gary E. Sommargren, Santa Cruz, Calif., assignor to Zygo, Corporation, Middlefield, Conn.

Filed Jul. 8, 1988, Ser. No. 216,821
Int. Cl.[4] G01B 9/02
U.S. Cl. 356—349 **40 Claims**



1. An interferometer system capable of measuring linear displacement and angular displacement simultaneously of a movable plane mirror comprising a source of a frequency stabilized input beam with two linear orthogonally polarized components; an optical system means comprising a stationary plane reference mirror, said optical system means disposed to reflect one polarization component of said input beam twice from a first position on said movable plane mirror to produce a first output beam and to reflect the other polarization component of said input beam twice from said stationary plane mirror to produce a second output beam; means disposed for recombining said first and second output beam into a third output beam having two orthogonally polarized components in which the phase difference between the two components of the third output beam is related to four times the linear displacement of said movable plane mirror at said first position; means disposed to divide said third output beam into a fourth output beam and a fifth beam which is parallel to, spatially displaced from, traveling in the same direction as said input beam, and has its polarization components rotated from said third output beam; means disposed for mixing said orthogonal components of said fourth output beam; means disposed to produce a first electrical measurement signal; means associated with said first electri-

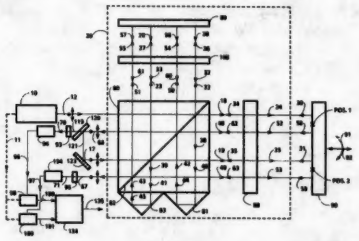
cal measurement signal for indicating a first measured phase, said first measured phase being related to four times the linear displacement of said movable plane mirror at said first position; means disposed to reflect one polarization component of said fifth beam twice from a second position on said movable plane mirror to produce a sixth output beam and to reflect the other polarization component of said fifth beam twice from said stationary plane mirror to produce a seventh output beam; means disposed for recombing said sixth and seventh output beams into an eighth output beam having two orthogonally polarized components in which the phase difference between said two components of said eighth output beam is related to four times the difference of the linear displacements of said movable plane mirror at said first and second position; means disposed for mixing said orthogonal components of said eighth output beam; means disposed to produce a second electrical measurement signal; and means associated with such second electrical measurement signal for indicating a second measured phase, said second measured phase being related to the angular displacement of said movable plane mirror; whereby said linear and angular displacement of said movable plane mirror may be simultaneously accurately measured in a single interferometer system.

4,881,816

LINEAR AND ANGULAR DISPLACEMENT MEASURING INTERFEROMETER

Carl A. Zanoni, Middlefield, Conn., assignor to Zygo, Corporation, Middlefield, Conn.

Filed Jul. 8, 1988, Ser. No. 216,843
Int. Cl.[4] G01B 9/02
U.S. Cl. 356—349 **38 Claims**



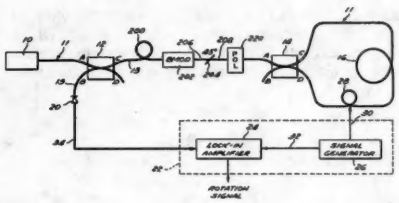
1. An interferometer system capable of measuring linear displacement and angular displacement simultaneously of a movable plane mirror comprising a source of a frequency stabilized input beam with two linear orthogonally polarized components; optical system means comprising a stationary plane reference mirror, said optical system being disposed to reflect one polarization component of said input beam twice from a first position on said movable plane mirror to produce a first output beam and to reflect the other polarization component of said input beam twice from said stationary plane mirror to produce a second output beam; means disposed for recombining said first and second output beams into a third output beam having two orthogonally polarized components in which the phase difference between the two components of the third output beam is related to four times the linear displacement of said movable plane mirror at said first position; means to divide said third output beam into a fourth output beam and a fifth beam which is parallel to, spatially displaced from, and traveling in the same direction as said input beam; means disposed for mixing said orthogonal components of said fourth output beam; means disposed to produce a first electrical measurement signal; means associated with said first electrical measurement signal for indicating a first measured phase, said first measured phase being related to four times the linear displacement of said movable plane mirror at said first position; means disposed to reflect one polarization component of said fifth beam twice from a second position on said movable plane mirror to produce a sixth output beam and to reflect the other polarization component of said fifth beam twice from said stationary plane mirror to produce a seventh output beam; means disposed for recombining said sixth and seventh output beams into an eighth output beam having two orthogonally polarized components in which the phase difference between the two components of the eighth output beam is related to four times the sum of the linear displacements of said movable plane mirror at said first and second positions; means disposed for mixing said orthogonal components of said eighth output beam; means disposed to produce a second electrical measurement signal; means associated with said second electrical measurement signal for indicating a second measured phase, said second measured phase being related to four times the sum of the linear displacement of said movable plane mirror at said first and second positions; and means disposed to form the difference between one-half of said second measured phase and said first measured phase to produce a signal related to the angular displacement of said movable plane mirror; whereby said linear and angular displacement of said movable plane mirror may be accurately measured in a single interferometer system.

4,881,817

FIBER OPTIC ROTATION SENSOR UTILIZING HIGH BIREFRINGENCE FIBER AND HAVING REDUCED INTENSITY TYPE PHASE ERRORS

Byoung Y. Kim, Menlo Park; Sidney L. A. Carrara, and Herbert J. Shaw, both of Stanford, all of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed Sep. 19, 1986, Ser. No. 909,741
Int. Cl.[4] G01B 9/02
U.S. Cl. 356—350 **28 Claims**

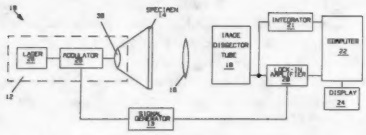


18. An interferometer, comprising:
a sensing loop;
a source of light;
a first coupler for coupling light to and from said loop;
a detector;
a second coupler for coupling light output from said loop to said detector;
a polarizer between said first and second couplers;
an intensity equalizer between said polarizer and said light source; and
an optical path comprised of birefringent optical fiber for guiding light propagating from said source to said first coupler, said fiber having an axis of birefringence aligned with an axis of polarization of said polarizer.

4,881,818
DIFFERENTIAL IMAGING DEVICE

Carlos Bustamante; Frederick K. Husher, and David Beach, all of Albuquerque, N. Mex., assignors to The University of New Mexico, Albuquerque, N. Mex.

Filed Apr. 22, 1986, Ser. No. 855,006
Int. Cl.[4] G01N *21/21*
U.S. Cl. 356—367 1 Claim



1. An apparatus for forming a differential image of a specimen comprising:

means for illuminating said specimen with polarized light having a polarization which oscillates between a first preselected state of polarization and a second preselected state of polarization, said oscillation occurring at a predetermined frequency;

means for detecting the intensity of light leaving a selected point on said specimen, said detecting means including means for generating an electrical signal having an amplitude related to the intensity of light leaving said selected point as a function of time, said generating means having a response time substantially less than the period of said predetermined frequency;

differential means for measuring the amplitude of the component of said electrical signal in a selected frequency band including said predetermined frequency;

integral means for measuring the amplitude of said electrical signal averaged over a time greater than one period of said predetermined frequency; and

image generating means for causing said detecting means to select each of a plurality of preselected points and for displaying the ratio of the amplitudes measured by said differential and integral measuring means as a two dimensional image,

wherein said detecting means includes:

means for imaging the light leaving said specimen on a surface;

means for detecting the intensity of light at the point on said surface corresponding to said selected point, and

wherein said intensity detecting means includes an image dissector tube with its photocathode coincident with said surface.

4,881,819
METHOD AND APPARATUS FOR PREPARING CONCRETE MORTAR

Frederik C. Blees, Deventer, Netherlands, assignor to Deltracon Deventer B.V., Netherlands

Filed Jan. 20, 1988, Ser. No. 146,174
Claims priority, application Netherlands, Jan. 20, 1987, 8700131
Int. Cl.[4] B28C *7/04*
U.S. Cl. 366—8 7 Claims

1. The method of making a batch of concrete mortar from which a useful concrete element may be formed, which comprises the steps of:

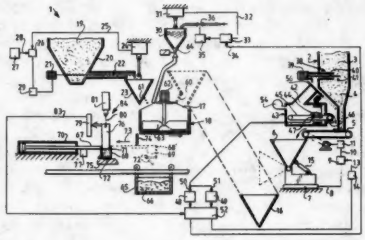
a. providing a supply of sand which has a variable moisture content,

b. providing a supply of binder,

c. metering a quantity of the sand to provide a formulated weight of dry sand plus a weight amount of contained water due to the moisture content of the quantity of sand,

d. drying a sample of the quantity of sand metered in step c and determining the difference in weight of the sample before and after drying,

e. metering a quantity of binder until the quantity of binder equals a formulated weight of binder,



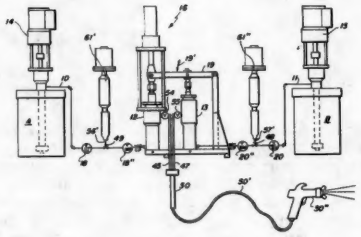
f. metering a quantity of water in dependence upon the difference in weight determined in step d until the quantity of water plus the weight amount of contained water of step c equals a formulated weight of water, and

g. intensively admixing the formulated weights of steps c-e until a batch of the concrete mortar is formed.

4,881,820
METHOD OF AND DEVICE FOR PROPORTIONING AT LEAST ONE VISCOUS SUBSTANCE

Peter Lückhoff, Kierspe, Fed. Rep. of Germany, assignor to Reinhardt Technik GmbH & Co., Fed. Rep. of Germany

Continuation of Ser. No. 910,633, Sep. 23, 1986, abandoned. This application Feb. 11, 1988, Ser. No. 157,131
Claims priority, application Fed. Rep. of Germany, Jan. 24, 1985, 3502333; Aug. 16, 1985, 3529486; Oct. 14, 1985, 3536594
Int. Cl.[4] B01F *15/02, 15/04*
U.S. Cl. 366—142 3 Claims



1. An apparatus for metering and mixing viscous components of a multicomponent mixture, said apparatus comprising:

(a) storage container means for storing respective components of said multicomponent mixture;

(b) extrusion means (12, 13) for metering and discharging respective components of said mixture, said extrusion means including an extrusion chamber and at least one extrusion valve associated with each component of said mixture;

(c) delivery pump means (14, 15) for pumping respective components of said mixture from said storage container means to said extrusion means via associated delivery lines (10, 11), each said delivery line including at least one check valve (18‴, 20‴) for preventing back-flow of said pumped components to said storage container means;

(d) mixing and delivery means connected with said extrusion means by way of extrusion delivery lines (45, 47) and extrusion delivery valves (54, 55) for mixing said respective components in a mixing chamber (50) and for deliver-

ing a resulting multicomponent mixture to a utilization device (50");

(e) pressure equalizing means (61', 61"') for equalizing the pressure in said extrusion chamber and said mixing chamber prior to metering and discharging, said pressure equalizing means comprising respective piston cylinder units having a chamber in communication with said respective delivery lines of said storage container means of each said viscous component, said piston-cylinder units operable to fill upon supply of respective components to said delivery lines, and; said piston-units actuable by a pressure medium to maintain a predetermined pressure in the chamber thereof.

4,881,821

APPARATUS FOR MIXING AND DOSING SYNTHETIC RESIN COMPONENTS AND PROCESS FOR THE OPERATION OF THIS APPARATUS

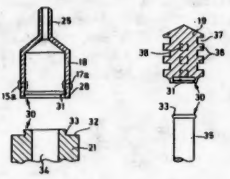
Jean Stutz, Tübach, Switzerland, assignor to Spritztechnik, AG., Tübach, Switzerland

Filed Oct. 21, 1987, Ser. No. 111,371

Claims priority, application Switzerland, Oct. 24, 1986, 4 236/86-8

Int. Cl.[4] B01F *15/02, 15/04, 7/00*

U.S. Cl. 366—162 **6 Claims**



1. A mixing head for mixing and dosing at least two synthetic resin components together to produce a single product, said head comprising:

a mixing head casing having an end port;

a rotor drive shaft extending in the casing and having a drive end extending out of the end port;

a hollow mixing chamber for receiving said components, the components being mixed together in the chamber to produce the product, the chamber having a discharge port through which the product is discharged, said chamber having a connection port adapted for detachable connection with the end port;

first quick connecting-disconnecting means mounted partially at the end port of the casing and partially at the connection port of said chamber for detachably connecting the end port of the casing to and disconnecting the end port of the casing from the connection port of the chamber;

rotor means including a mixing rotor disposed in the chamber and having an end facing said drive end of the shaft; and

second quick connecting-disconnecting means mounted partially on the drive end of the shaft and partially on the end of the rotor facing said drive end of the shaft for detachably connecting the shaft to and disconnecting the shaft from the rotor,

said rotor and said shaft having a common axis,

said first means including a first outer circular convex coupling ring provided at one of the end and connection ports and a first inner circular concave groove provided at the other of the end and connection ports, said first ring and first groove being adapted for detachable mating engagement to connect said casing and said chamber to each other in an aligned position thereof,

said second means including a second outer circular convex coupling ring at one of said end of the rotor and said drive end of the shaft and a second inner circular concave groove at the other of said end of the rotor and said drive end of the shaft, said second ring and second groove being adapted for detachable mating engagement to connect said shaft and said rotor to each other in an axially aligned position thereof whereby said mixing chamber and said mixing rotor can be replaced by a clean product-free chamber and a clean product-free rotor in the mixing head.

4,881,822

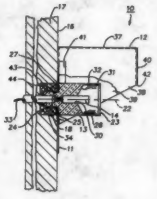
OUTDOOR TEMPERATURE SENSING ASSEMBLY

Ralph G. Ridenour, 626 Lexington-Ontario Rd., Mansfield, Ohio 44903

Filed Mar. 28, 1988, Ser. No. 175,991

Int. Cl.[4] H05K *5/03*

U.S. Cl. 374—109 **15 Claims**



1. An outdoor temperature sensing assembly comprising in combination:

a mount adapted to be mounted in an outdoor environment;

a thermal mass of plastics material;

means securing said thermal mass relative to said mount;

a first recess extending into said thermal mass;

a temperature sensor mounted in said first recess;

a shield mounted on said mount and having wall means establishing an upper wall and side walls;

said upper wall lying above said thermal mass and being a closed surface to shield the temperature sensor from sun, rain and wind; and

said side walls being disposed laterally of said thermal mass, extending downwardly and encompassing a majority of said thermal mass, and with the lower end of said shield being open to the outdoor air environment.

4,881,823

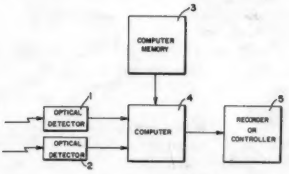
RADIATION THERMOMETRY

Fumio Tanaka, Fukuoka, Japan, and David P. DeWitt, West Lafayette, Ind., assignors to Purdue Research Foundation, West Lafayette, Ind.

Filed Mar. 29, 1988, Ser. No. 175,051

Int. Cl.[4] G01J *5/52*

U.S. Cl. 374—126 **10 Claims**



1. A method of determining true temperature of a heated target material by its radiation based on prior knowledge of a relationship between a first spectral emissivity and a second spectral emissivity for said target material, said relationship

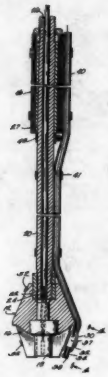
being defined by a curve or mathematical equation describing a plurality of said first and second spectral emissivities determined at different spectral conditions, comprising measuring two spectral radiances from the target material at spectral conditions corresponding to said first and second spectral emissivities, iterating the following steps of assuming a temperature of the target material, then calculating a pair of spectral emissivities by dividing said two spectral radiances by two spectral blackbody radiances at said assumed temperature, until said pair of calculated spectral emissivities satisfy said relationship whereat said assumed temperature is the true temperature of said target material.

4,881,824

IMMERSIBLE PROBE

Richard A. Falk, Ft. Lauderdale, Fla., and James Colzani, Menomonee Falls, Wis., assignors to Midwest Instrument Co., Inc., Hartland, Wis.

Filed Dec. 23, 1988, Ser. No. 289,040
Int. Cl.[4] G01K *7/02, 1/08*
U.S. Cl. 374—140 **6 Claims**



6. A molten metal probe for obtaining data from a molten metal bath comprising a first weight having a cavity, a sensor supported in said cavity and being exposed to the molten metal bath, a second weight in the form of an elongated tube which is connected to said first weight, said elongated tube having a portion above the upper surface of the molten metal to provide a downward counter force to offset the buoyant force and to provide an equilibrium of the probe with said sensor, said sensor being positioned at an appropriate depth in said molten metal to provide reliable readings.

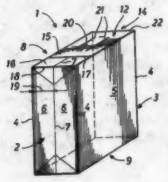
4,881,825

CONTAINER AND A METHOD AS WELL AS AN ASSEMBLY FOR ITS MANUFACTURE

Ejvid H. B. Olesen, Mariager, Denmark, assignor to Unibag A/S, Roslev, Denmark

Filed Mar. 30, 1988, Ser. No. 175,260
Claims priority, application Denmark, Mar. 30, 1987, 1619/87
Int. Cl.[4] F16C *32/06*
U.S. Cl. 383—906 **19 Claims**

1. A container, especially a bag, of flexible material, such as paper, plastic film, foil or similar materials comprising a tube-shaped blank of said material divided by means of gussets into two opposite side walls and two intermediate pairs of gusset walls, and having at least one bottom of the block bottom type including a folded end area of said side walls and said pairs of gusset walls, wherein said container (1) including a tightly sealed, outwardly folding discharge valve (11) in one of the said block bottoms (8, 9), said valve being resealable and provided with a gripping means (16), and its opening being provided by means of shortening at least a part of the folded end



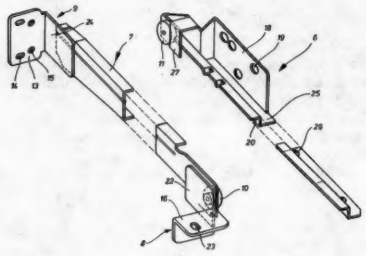
areas of one pair of gusset walls (6) and adjacent side walls (5) to substantially the same length as the depth (19) of the gusset (2, 3).

4,881,826

UNDER-BASE GUIDING SYSTEM FOR A DRAWER

Alfred Grass, Höchst, Austria, assignor to Alfred Grass Ges.m.b.H. Metallwarenfabrik, Hochst/Blbg., Austria

Filed Jun. 14, 1988, Ser. No. 206,506
Claims priority, application Austria, Apr. 7, 1988, 906/88
Int. Cl.[4] A47B *88/00*
U.S. Cl. 384—19 **1 Claim**



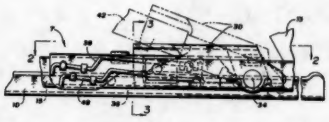
1. An under-base guiding system for a drawer of a piece of furniture, the piece of furniture having a body provided with side walls, a rear, a front, and rails having guide rollers, and the drawer being provided with a base, and rolls having guide rollers, wherein the body rails are situated beneath the drawer base, and are each fastened to the body adjacent by front connector means and to the body adjacent the rear by rear connector means, and the drawer rails engage the body rails under the drawer base via the guide rollers, the front connector means comprises plates to which the body rails are secured by spot welds, the front connector means also comprising angled plates which are fastened to a front batten of the body, the rear connector means comprising elongate plates to which the body rails are secured by spot welds, the rear connector means also comprising angled plates which are fastened to the rear of the body, the angled plates of the front and rear connector means are provided with slots for receiving means to adjustably anchor the front and rear connector means to the furniture body, each drawer rail has a generally vertical screw-on plate and a generally horizontal engagement surface for the lower extremity of the associated drawer sidewall, and the drawer rails have an overlapping lug proximate the vertical screw-on plate and rearward of the drawer base.

4,881,827

APPARATUS AND METHOD OF ANTI-RATCHETING VEHICLE SEAT ADJUSTER SLIDE

Hans J. Borlinghaus, Roseville; Michael G. Orlowsky, Sterlin Heights; Neil G. Goodbred, Royal Oak; Mladen Humer, East Detroit, all of Mich., and Steven J. Cooper, Breaston, England, assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 2, 1988, Ser. No. 162,736
Int. Cl.[4] A47C 3/00
U.S. Cl. 384—47 **17 Claims**



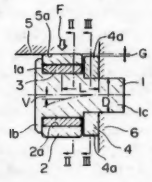
1. A manual vehicle seat adjuster slide, said adjuster slide in combination comprising:
- a lower channel for connection with said vehicle, said lower channel having a series of longitudinally spaced notches;
- an upper channel for connection with said seat slidably mounted on said lower channel;
- a lift bar pivotally connected with said upper channel being sequentially manually operable from a first angular release position to a second angular positional range; and
- a latch pivotally connected with said upper channel along a pivotal axis fixed with respect to said upper channel, said latch having a tab for selective engagement into one of said lower channel notches to fix the position of said upper channel with respect to said lower channel, and said latch being spring biased to engage said tab with said upper channel whereby said lift bar in said second angular positional range directly contacts said latch to disengage said latch from said lower channel notch to allow adjustment of said seat and whereby said lift bar can return to said first release angular position if said latch does not reengage with one of said notches upon manual release of said lift bar.

4,881,828

ROLLING CONTACT DEVICE

Heizaburo Kato, Shizuoka, Japan, assignor to Sankyo Manufacturing Company, Ltd., Tokyo, Japan

Filed Mar. 31, 1989, Ser. No. 331,127
Claims priority, application Japan, Mar. 31, 1988, 63-43329[U]
Int. Cl.[4] F16C 21/00, 19/52, 41/04
U.S. Cl. 384—127 **5 Claims**



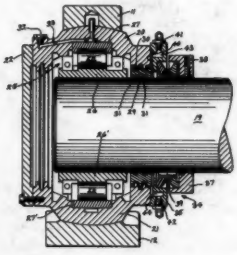
1. A rolling contact device comprising:
- a shaft having an outer track surface;
- an outer ring surrounding said shaft and having an inner track surface;
- rolling elements disposed between said shaft and said outer ring in a relationship spaced apart from each other circumferentially of said shaft, the outer peripheral surface of said outer ring being adapted to be in rolling contact with a track surface of an element of an apparatus; and
- a projection provided on said shaft and having a load supporting portion opposing to said track surface of said element with a small gap defined therebetween;
- said projection being arranged such that, when a radial load greater than a predetermined value acts on said outer ring, said track surface of said element may abut on said load supporting portion of said projection.

4,881,829

SUBMERSIBLE BEARING ASSEMBLY

Lester M. Koelsch, 175 Ridge Ct., Pewaukee, Wis. 53072

Continuation of Ser. No. 880,562, Jun. 30, 1986, abandoned. This application Jul. 15, 1987, Ser. No. 73,958
Int. Cl.[4] F16C 33/72, 33/76, 33/80
U.S. Cl. 384—448 **11 Claims**



1. A submersible shaft bearing assembly comprising:
- a stationary housing defining a bearing chamber with an opening at one end;
- a bearing mounted within the chamber in the housing;
- a housing seal sealing the open end of the housing, the housing seal being adapted to be mounted on and to rotate with a shaft;
- a seal chamber outside the housing and in communication with one side of the housing seal, said seal chamber including a cartridge seal ring attached to the housing at the open end and about the housing seal, a shaft seal ring spaced from the cartridge seal ring and adapted to be mounted on and to rotate and seal with the shaft, and a chamber seal disposed about and spaced from the shaft, said chamber seal sealing with both the stationary cartridge seal ring and the rotatable shaft seal ring;
- a low viscosity lubricating fluid in the seal chamber; and
- means for pumping the lubricating fluid into and out of said seal chamber and for visually inspecting the fluid for contamination as it is pumped.

4,881,830

SPLIT RING ROLLER BEARING CAGE

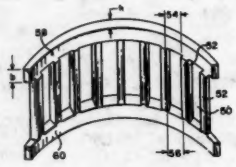
Richard W. Shepard, Torrington; Earle Corban, Winsted, both of Conn., and Peter Preston, Oshkosh, Wis., assignors to The Torrington Company, Torrington, Conn.

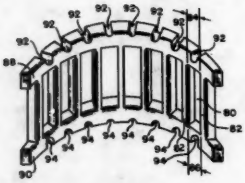
Filed Jan. 31, 1989, Ser. No. 304,137
Int. Cl.[4] F16C 33/46
U.S. Cl. 384—577 **4 Claims**

1. An annular split cage comprising: two semicircular parts, each semicircular part having a plurality of circumferentially separated crossbars interconnecting a pair of axially separated end rims to form a plurality of circumferentially separated pockets; each end rim having circumferential ends and a circumferential center portion located the same circumferential distance from each circumferential end, the cross-sectional areas of the end rims decreasing from the circumferential

center portion of the end rims to each circumferential end of the end rims.

4. An annular split cage comprising: two semicircular parts, each semicircular part having a plurality of circumferentially separated crossbars interconnecting a pair of axially separated end rims to form a plurality of circumferentially separated





pockets; each end rim having circumferential ends and a circumferential center portion located the same circumferential distance from each circumferential end, each end rim having a plurality of notches consisting of one notch adjacent each pocket, the depths of said notches increasing from the circumferential center portion of the end rims to each circumferential end of the end rims.

4,881,831

PRINTER

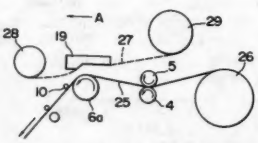
Masaaki Takita, Ibaraki; Yoshikazu Tsuru, Hirakata; Toshiharu Kitagawa, Katano, and Yoshikazu Nomura, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 11, 1988, Ser. No. 155,098

Claims priority, application Japan, Feb. 18, 1987, 62-35033; Feb. 18, 1987, 62-35036

Int. Cl.[4] B41J *3/02*

U.S. Cl. 400—120 **3 Claims**



1. A printer for use with an ink film comprising:

a capstan roller;

a pinch roller provided in correspondence with said capstan roller;

a paper supply means arranged upstream of said capstan roller and said pinch roller;

a printing head for applying heat to an ink film to be interposed between said printing head and paper to be printed;

a platen roller provided with sliding friction,

said capstan roller and said pinch roller clamping therebetween a paper to be printed fed from said paper supply means and feeding it to said platen roller; and,

a paper feed roller disposed in correspondence with said platen roller,

wherein said pinch roller and said capstan roller are disposed upstream of said paper feed roller and said platen roller but downstream of said paper supply means so as to apply a back tension to the paper during printing, while the paper is fed by said pinch roller, said capstan roller, said platen roller and said paper feed roller so as to cause the paper to slip on said platen roller, relative to said platen roller during paper feeding.

4,881,832

PRINT WIRE DRIVING DEVICE FOR WIRE TYPE DOT PRINTER

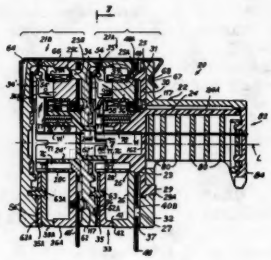
Akio Mitsuishi; Yasuhiko Nakazawa, and Takumi Sato, all of Suwa, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan

Continuation of Ser. No. 823,167, Jan. 27, 1986, Pat. No. 4,767,227. This application Aug. 25, 1988, Ser. No. 236,391

Claims priority, application Japan, Jan. 25, 1985, 60-11854; Jan. 25, 1985, 60-11855; Jan. 25, 1985, 60-11856; Jan. 25, 1985, 60-11857; Jan. 25, 1985, 60-11858; Jan. 25, 1985, 60-8970; Jan. 25, 1985, 60-8971; Feb. 20, 1985, 60-31928; Feb. 20, 1985, 60-23356; Feb. 20, 1985, 60-23357

Int. Cl.[4] B41J *3/12*

U.S. Cl. 400—124 **12 Claims**



1. A print wire driving apparatus for a wire dot printer comprising a plurality of printing wires each having a driving lever coupled to a first end thereof, magnetic actuation means for selectively actuating said driving levers to displace said printing wires, said magnetic actuation means including a through-hole extending essentially through the center thereof, said magnetic actuation means including a plurality of coil cores for selectively driving said respective driving levers, a first wire guide positioned in said through-hole of said magnetic actuation means, said wire guide having a plurality of narrow guide grooves formed around the periphery thereof for guiding the ends of said driving levers where said printing wires are coupled, said through-hole in said magnetic actuation means being circular, said wire guide being cylindrical and including a plurality of openings for guiding said printing wires along the longitudinal axis of said wire guide, said ends of said driving levers where said printing wires are coupled being essentially flat in the longitudinal direction of said printing wires to permit a plurality of such driving levers to be arranged around said wire guide and guided by said narrow guide grooves.

4,881,833

DRIVE MECHANISM FOR A SMALL-SIZED PRINTER

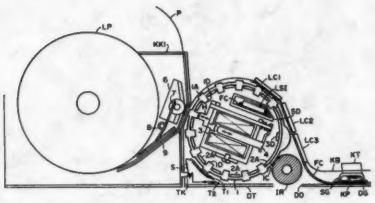
Mitsuaki Seki, Machida; Satoshi Watanabe, Chichibu, and Hideaki Miyakawa, Yokohama, all of Japan, assignors to Cannon Kabushiki Kaisha and Cannon Denshi Kabushiki Kaisha, both of Tokyo, Japan

Continuation of Ser. No. 85,327, Aug. 12, 1987, abandoned, which is a continuation of Ser. No. 831,593, Feb. 21, 1986, abandoned, which is a division of Ser. No. 779,316, Sep. 24, 1985, Pat. No. 4,589,787, which is a continuation of Ser. No. 732,799, May 10, 1985, abandoned, which is a continuation of Ser. No. 599,217, Apr. 13, 1984, abandoned, which is a continuation of Ser. No. 459,588, Jan. 20, 1983, abandoned, which is a continuation of Ser. No. 175,521, Aug. 5, 1980, abandoned. This application Apr. 21, 1988, Ser. No. 186,678

Claims priority, application Japan, Aug. 8, 1979, 54-101104; Aug. 9, 1979, 54-101660; Aug. 9, 1979, 54-101661; Nov. 16, 1979, 54-148660

Int. Cl.[4] B41J *23/34*

U.S. Cl. 400—185 4 Claims



1. A printer comprising:

a type wheel unit including (1) a cylindrical supporting member having a plurality of holes therearound, (2) a type belt having a back surface thereof provided with a plurality of projections and a front surface having a plurality of types each corresponding to one of said projections, said type belt being disposed around said supporting member so that each said projection is engaged with one of said holes around said supporting member, and (3) power transmission means mounted on an end of said type wheel unit and surrounding said type wheel unit;

an ink roller for applying an ink to the types and disposed to avoid said power transmission means;

hammer means accommodated within said type wheel unit for striking said projections of said type belt to project the corresponding type away from said supporting member and toward a printing paper;

an outer-rotor type pulse motor mounted on a rotating axis of said type wheel unit at said type wheel end with a rotor of said motor fixed to said supporting member for rotation thereof;

a paper feed roller arranged to intermittently contact said power transmission means to provide a force for feeding a printing paper so that said outer-rotor type pulse motor can directly rotate said type wheel unit and said type wheel can rotate said paper feed roller;

wherein said power transmission means includes a resilient member having a projection formed on an outer circumferential portion thereof, and wherein said resilient member comprises a material having a frictional force sufficient to drive said paper feed roller.

4,881,834

PRINTING APPARATUS CAPABLE OF BACKLASH REGULATION

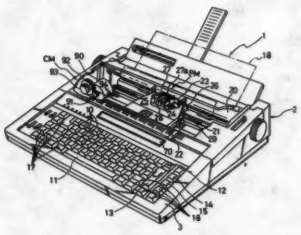
Yougi Sato, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed May 16, 1988, Ser. No. 194,312

Claims priority, application Japan, May 14, 1987, 62-117582

Int. Cl.[4] B41J *19/30, 25/30*

U.S. Cl. 400—279 4 Claims



1. A printing apparatus capable of backlash regulation having inputting means for inputting code data of characters and various command signals comprising:

printing means for printing characters on a print paper with a print head mounted on a carriage movable forward and backward along a print line by a carriage drive system;

store means for storing inputted data from said inputting means;

control means for controlling said printing means;

mode setting means for setting said control means at a specified mode in which, according to a command signal from said inputting means, each inputted data is stored in said store means successively while backspacing said carriage from a given reference position determined by the mode setting means to a predetermined print position determined by said inputted data stored in said store means without regulating a positional deviation in the carriage driving system, and then said inputted data in said store means are printed together in response to a print start command signal; and

regulating means for controlling said printing means to regulate said positional deviation in said carriage driving system in response to said print start command signal in said specified mode.

4,881,835

PRINTER HAVING ADJUSTABLE GAP BETWEEN PRINT HEAD AND RECORDING MEDIUM

Takeshi Nilkawa, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Apr. 20, 1988, Ser. No. 184,056

Claims priority, application Japan, Apr. 23, 1987, 62-100990

Int. Cl.[4] B41J *11/20*

U.S. Cl. 400—56 8 Claims

1. A printer for printing on a recording medium, comprising:

a platen for supporting the recording medium;

a print head disposed opposite to said platen, for effecting a printing operation on said recording medium supported by said platen;

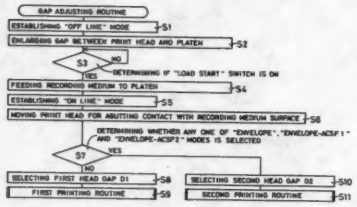
a carriage movable in a direction parallel to said platen and supporting said print head;

gap changeover means for moving said print head and said platen relative to each other in a direction toward and away from each other, and thereby adjusting a head gap between said recording medium supported by said platen and said print head;

discriminating means for generating an output signal indicating that said recording medium includes a local portion

whose thickness is larger than that of a remaining portion thereof;

gap control means for controlling said gap changeover means such that said head gap is normally equal to a first head gap, said gap control means being responsive to said output signal of said discriminating means, for controlling said changeover means such that said head gap is changed to a second head gap which is greater than said first head gap; and



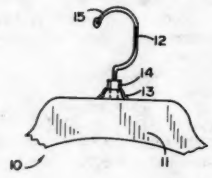
printing speed control means for normally selecting a first printing speed at which said print head effects said printing operation, said printing speed control means being responsive to said output signal of said discriminating means, for selecting a second printing speed which is lower than said first printing speed wherein said printing speed control means comprises means for moving said carriage at a rate lower than that used for said first printing speed, and means for activating said print head at a frequency lower than that for said first printing speed to established said second printing speed.

4,881,836

INFORMATION DISPLAY MEANS FOR GARMENT HANGER HOOKS

Russell O. Blanchard, Zeeland, Mich., assignor to Batts, Inc., Zeeland, Mich.

Filed Apr. 7, 1988, Ser. No. 179,023
Int. Cl.[4] G09F *3/00*
U.S. Cl. 40—322 **17 Claims**



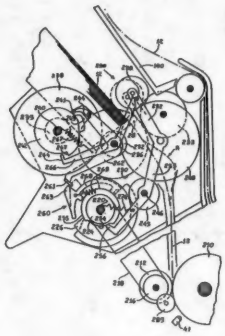
1. An information display means adapted to be mounted on and surround the base of a support hook of a garment hanger which base portion of said support hook has non-circular cross-sectional shape, said display means being a tubular body having a pair of ends, said tubular body being of rectangular cross section and providing a display panel adapted to face lengthwise of the hanger, said body having a web extending across the opening through said body, said web having an aperture, said aperture having an elongated primary portion having a pair of ends and a pair of slot-like end portions communicating with said ends of said primary portion and extending transversely of said primary portion, said primary portion midway between its ends having an enlarged somewhat circular central portion separated from each of said end portions by a narrow throat substantially closing said primary portion, said body and said web being molded of a plastic capable of resilient deflection whereby said web clamps against the base of the hook of the garment hanger and positively holds the display means against rotation about the hook.

4,881,837

AUTOMATIC SHEET FEEDER

Remo Falconieri, S. Giorgio, and Sergio Uggetti, Ivrea, both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Filed Jun. 9, 1987, Ser. No. 60,066
Claims priority, application Italy, Jun. 16, 1986, 67491 A/86
Int. Cl.[4] B41J *13/036*
U.S. Cl. 400—625 **4 Claims**



1. An automatic sheet feeding unit for a typewriter or like printing office machine having motor means for selectively rotating a platen roller in both a forward direction and a reverse direction with respect to the advancing movement of a sheet toward a printing position, said sheet feeding unit comprising a paper sheet magazine to hold said sheets to be fed to said platen, a separating roller rotatably connected with said platen through a mechanical motion transmission and mounted on a support member selectively rotatable from a rest position to an operating position to bring said separating roller into engagement with a first sheet to be fed to said platen roller, a first cam element cooperating with said support member for rotating the same in said operating position, an operable clutch device interposed between said platen roller and said first cam element for selectively connecting said first cam element with said motion transmission during a forward rotation of the platen roller subsequent to a first reverse platen rotation, a second cam element rotated by said motion transmission for actuating said clutch device when said platen roller rotates in said reverse direction, said second cam element being rotated in such a manner that one complete revolution of said second cam element corresponds to the maximum of the length of a sheet advanced by said platen roller during printing, said second cam element having a lobe and a stopping shoulder, said stopping shoulder stopping said second cam element in an angular reference position corresponding to the starting of said first reverse platen rotation,

a clutch control member cooperating with said lobe and responsive to said first reverse platen rotation to actuate said clutch device, whereby during said subsequent forward platen rotation a sheet is advanced from said magazine towards said platen roller and for disabling said

clutch device when said sheet is engaged by said platen roller at the completion of one revolution of said first cam element, and a rotatable lever having a first end cooperating with said support member and a second end, said lever being rotated by said support member in said operating position from a rest position in which said second end engages said shoulder for stopping said second cam element in said reference position, to an active position in which said shoulder overcomes said second end during said forward platen rotation, whereby said first cam element remains stopped, preventing said separating roller from being further engaged with a second sheet in the magazine during both forward and reverse platen rotations occurring after a fed sheet has been engaged by said platen roller.

4,881,838

PRINTING PLATEN

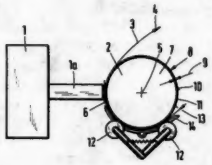
Gerhard Lohrmann, Thalfingen; Guenter Engelhardt, Niederstotzingen, and Thomas Werner, Ulm, all of Fed. Rep. of Germany, assignors to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Filed Aug. 12, 1985, Ser. No. 765,251

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1984, 3430092

Int. Cl.[4] B41J *11/057*

U.S. Cl. 400—662 **6 Claims**



1. Platen in matrix dot printers, the platen being provided for printing and for the transport of the print medium, comprising:

a basic body of cylindrical configuration and a coating thereon having been applied by plasma or flame spraying, being considerably harder than rubber and having a thickness of not less than 1/100 mm but not more than 5 mm and providing a frictional surface for abutment with the print medium.

4,881,839

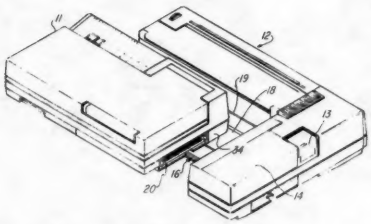
PORTABLE ELECTRONIC DATA HANDLING/DATA ENTRY SYSTEM

Thomas R. Grimm, Troy, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 14, 1988, Ser. No. 206,640

Int. Cl.[4] B41J *29/02*

U.S. Cl. 400—692 **15 Claims**



1. A portable data handling/data entry system comprising:

(a) an electronic data handling module;

(b) an electro-mechanical , data entry module; and

(c) means to releasably couple said modules together, said means including:

(d) a latch bar extending from one of said modules and latching means secured to the other of said modules for releasably latching said latch bar, said latching means including:

(e) a latch for mating with said latch bar;

(f) ejector bar means movable to simultaneously disengage said latch from said latch bar and urge said one of said modules away from said other of said modules; and

(g) means to move said ejector bar means to simultaneously disengage said latch from said latch bar and urge said one of said modules, said ejector bar means includes an ejector bar and a contact plate secured to said ejector bar, said contact plate urging said one of said modules away from said other of said modules away from said other of said modules.

4,881,840

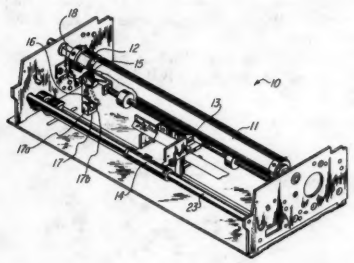
PRINTER HAVING PAPER-OUT AND COLUMN ZERO DETECTION MECHANISM

Mark A. Rendon, Belton; Erik A. Treszoks, and Thomas R. Grimm, both of Temple, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Sep. 30, 1988, Ser. No. 251,435

Int. Cl.[4] B41J *29/42, 29/38*

U.S. Cl. 400—705.1 **19 Claims**



3. A printer for printing characters on paper having a carriage supporting a printhead that traverses the paper, and having a detection mechanism for detecting both the absence of paper and for detecting the end position of the carriage, comprising:

(a) a lever arm rotatable about a pivot and normally disposed in a first predetermined position to detect a first predetermined condition,

(b) means on said lever arm responsive to a second predetermined condition to provide rotation of said lever arm in a first direction from said first predetermined position to a second predetermined position, and

(c) means responsive to a third predetermined condition to provide rotation of said lever arm responsive to a third predetermined condition in a direction opposite to said first direction from said first predetermined position to a third predetermined position.

4,881,841

HAND STAMPING DEVICE OR WRITING IMPLEMENT

Larry F. Irwin, 12860 San Fernando Rd., Sylmar, Calif. 91342

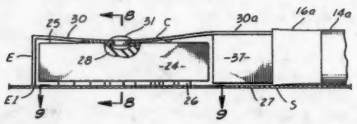
Filed Sep. 12, 1988, Ser. No. 242,553

Int. Cl.[4] B43K *29/00*

U.S. Cl. 401—195 **13 Claims**

1. A combination writing instrument and stamp, comprising:

(a) a housing having a longitudinal axis disposed in a first plane;
(b) a writing element carried by said housing; and
(c) a stamp means carried by said housing for making an ink imprint on a surface, said stamp means comprising:
(1) a supporting structure;
(2) imprinting indicia carried by said supporting structure and disposed in a second plane substantially parallel to



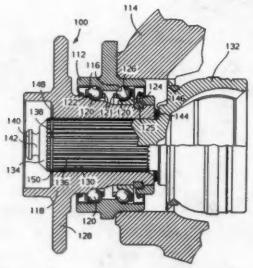
said first plane, said imprinting indicia being movable from a first at rest position to a second imprinting position wherein said imprinting indicia are disposed in a third plane substantially parallel to said first and second planes; and
(3) biasing means for yieldably resisting movement of said imprinting indicia between said first and second positions.

4,881,842

WHEEL BEARING ASSEMBLY

Robert C. Farrell, Frankenmuth, and George A. Lundy, Saginaw, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 17, 1988, Ser. No. 259,020
Int. Cl.[4] F16D 1/00
U.S. Cl. 403—19 **6 Claims**



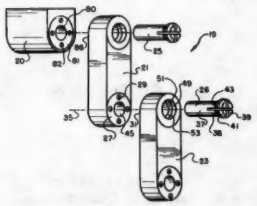
1. A wheel bearing assembly for a driven wheel of an automobile of the like comprising:
an outer bearing member which is adapted to be secured to support structure of an automobile or the like and which has outer raceway means,
an inner bearing member which is adapted for mounting a vehicle wheel and which has inner raceway means,
bearing balls which ride on the raceway means to rotatably support the inner bearing member in a fixed longitudinal relationship in the outer bearing member,
a drive member of a drive axle or the like, and
means for drivingly connecting the drive member to the inner bearing member in a lash free manner comprising
a splined bore of the inner bearing member, and
a stub shaft of the drive member which has an intermediate splined portion and a free end portion which has a pull groove for pulling the stub shaft through the splined bore of the inner bearing member.

4,881,843

JOINT STRUCTURE

Randy J. Randleman, Cleveland, Ohio, assignor to Those Characters From Cleveland, Inc., Independence, Ohio

Filed Mar. 25, 1988, Ser. No. 173,141
Int. Cl.[4] F16D 3/00
U.S. Cl. 403—92 **20 Claims**



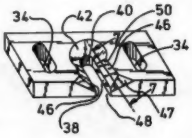
1. A joint structure comprising first and second joint members each having parallel juxtaposed surfaces and a common pivot axis extending perpendicular to said juxtaposed surfaces, one of said juxtaposed surfaces having detent means and the other of said juxtaposed surfaces having recess means, said detent and recess means having discrete angular positions in which they are engaged with each other and retain said joint members in discrete angular positions relative to said pivot axis, said second joint member having a recess, a pivot pin having a base portion connected with said first joint member and having an integral resilient portion extending into said recess of said second joint member, said pivot pin having a central axis defining the pivot axis for said joint members, the integral resilient portion of said pivot pin having two or more integral resilient fingers and a cam surface each of which circumscribe the pivot axis, the recess in said second joint member having a cam surface circumscribing the pivot axis, the cam surface of said resilient fingers and the cam surface of the recess cooperating to cause the resilient fingers resiliently to bend toward the pivot axis when said first and second joint members are urged apart, the profiles of the detent means and the recess means being designed to urge the detent and recess means out of engagement with each other and to also urge the joint members apart when a predetermined torque is applied to the joint members, and the resilient fingers exerting resilient biasing forces on the cam surface of the second joint member to urge the detent means and the recess means into engagement with each other when the applied torque is less than said predetermined amount.

4,881,844

CLIP DEVICE TO ATTACH A BACKSPLASH TO A COUNTERTOP

Robert L. Tremblay, 2890 Parkwood, Ann Arbor, Mich. 48104

Filed Jul. 30, 1987, Ser. No. 79,345
Int. Cl.[4] F16B 5/06
U.S. Cl. 403—407.1 **11 Claims**



1. A backsplash clip comprising a generally oblong body having a top and bottom, ends and long sides extending therebetween, a pair of holes extending through the body from top

to bottom, said holes spaced apart and adjacent the ends of the body, a straight slot extending from top to bottom and having opposed slot sides and a slot entrance thereto through one long side of the body between said holes, said slot perpendicular to said long side and said slot terminating in a half-round hole through the body, at least a portion of said opposed slot sides parallel to each other, a half round countersink bevel extending about the half-round hole and extending upwardly from the bottom of the body, a pair of side bevels extending upwardly from the bottom of the body on the sides of the slot, said side bevels extending in an outward direction relative to the slot, said side bevels generally narrowing from the slot entrance to junctures with the half-round countersink bevel, and said junctures comprising a pair of shoulders formed by an abrupt change in slope from each side bevel to the half-round countersink bevel at each juncture.

4,881,845

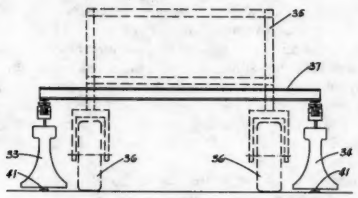
MOVEABLE ROADWAY BARRIER SYSTEM

Alan R. McKay, 1126 Hilltop Dr., Lafayette, Calif. 94549

Continuation of Ser. No. 815,456, Jan. 2, 1986, abandoned. This application Jul. 18, 1988, Ser. No. 220,926

Int. Cl.[4] E01F *13/00*

U.S. Cl. 404—6 **13 Claims**



1. A traffic barrier system which provides a safe separation between opposing lanes of vehicular traffic and is capable of being moved across lanes to change the direction of traffic lane flow comprising:

a plurality of barrier sections, having top, bottom and side surfaces, pivotably connected together adjacent the ends thereof, a vehicle capable of laterally transferring said barrier sections having thereon transfer beam means constructed to provide movement of said barrier sections from one side of said vehicle to the other side as the vehicle travels in one direction;

a pair of longitudinally spaced apart elements attached to said top surface of each barrier section only adjacent the barrier ends;

said transfer beam means and said longitudinally spaced apart elements including roller means rotatably fixed thereto for moving said barrier sections relative to said transfer beam means, the other of said transfer beam means and said longitudinally spaced apart elements including rail means engageable with said roller means;

whereby when said vehicle travels in said one direction, the transfer beam means engage the roller means consecutively for lateral displacement of the barrier sections.

4,881,846

BUILT-UP PLAYING COURT STRUCTURE AND METHOD FOR ITS CONSTRUCTION

Herman F. Burkstaller, Box 67, Nogal, N. Mex. 88341, assignor to Herman F. Burkstaller, Nogal, N. Mex.

Filed Mar. 28, 1988, Ser. No. 174,118

Int. Cl.[4] A01G *25/00;* **E02B** *11/00*

U.S. Cl. 405—37 **27 Claims**

1. A built-up, moisture content controlling playing court structure comprising:

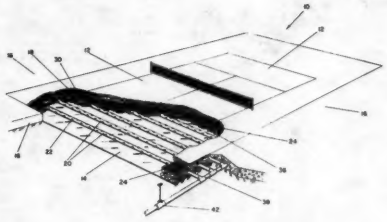
a built-up court surface layer comprising fine aggregate material;

a barrier surface substantially impervious to moisture spaced beneath said built-up court surface layer;

a containment wall positioned essentially peripherally about said built-up court surface layer and said barrier surface and extending upwardly from said barrier surface to about the level of said built-up court surface layer disposed thereabove;

a subsurface bed of aggregate disposed atop said barrier surface and beneath said built-up court surface layer, said subsurface bed of aggregate being peripherally surrounded by said containment wall;

a stabilizing layer of adhesive material applied atop said



subsurface bed of aggregate, said stabilizing layer providing supportive stability to said subsurface bed of aggregate, said layer of adhesive material comprising voids therein to provide adequate liquid conductivity between said subsurface bed of aggregate and said built-up court surface layer thereabove to substantially maintain the selected moisture content in said built-up court surface layer, said built-up court surface layer of fine aggregate material disposed atop and in said voids of said adhesive coated stabilizing layer; and

means for controllably introducing liquid to and draining liquid from said subsurface bed of aggregate and said built-up court surface layer to substantially maintain a selected moisture content in said built-up court surface layer.

4,881,847

ARTIFICIAL WATER LAGOONS

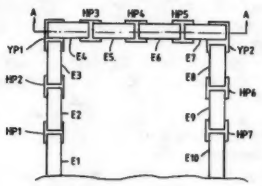
Claes M. C. Sandels, Sandhamnsgatan 21, S-115 40 Stockholm, Sweden

Filed Dec. 1, 1986, Ser. No. 937,023

Claims priority, application Sweden, Dec. 9, 1985, 8505812-1

Int. Cl.[4] E02B *3/00, 5/04*

U.S. Cl. 405—52 **11 Claims**



1. An arrangement to increase or decrease the temperature in sea water within a limited water area, said arrangement being constituted by a basin-like construction built in the sea, the water temperature of which should be increased or decreased, said construction comprising a bottom part rigidly anchored in the bottom of the sea, column-like parts rigidly

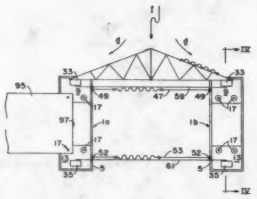
attached to and supported by said bottom part, said column-like parts to hold partitioning means in place in between, said column-like parts projecting in a vertical direction towards the water surface from said bottom part to form rigid corners of the basin-like construction, said partitioning means structure to hold wall elements which geographically separate the water inside and outside said basin-like construction, said wall elements being water-pervious to provide an exchange of the water inside and outside said basin-like construction.

4,881,848

METHOD OF FORMING AN IMMERSED DAM FOUNDATION AND A DAM STRUCTURE THEREON

Everald V. Wright, Pittsburgh, and Thomas L. Manley, Jr., Coraopolis, both of Pa., assignors to Davy McKee Corporation, Pittsburgh, Pa.

Filed Jul. 26, 1988, Ser. No. 224,140
Int. Cl.[4] E02B 7/02
U.S. Cl. 405—116 **23 Claims**



1. A method of constructing an immersed dam foundation, in a body of moving water having a floor, and of forming a dam structure thereon, without the requirement for large cofferdams that block large portions of the body of water for long time periods, comprising:

forming a plurality of laterally spaced support piers, having upstream and downstream ends, below the surface of the body of moving water, the piers having spaced stable anchor points thereon, and sheet piling about the perimeter thereof;

constructing a first temporary support post on the upstream end of each pier and a second temporary support post on the downstream end of each pier;

installing a temporary upstream current deflector between adjacent piers, whereby the current, and any carried sediments or debris in the body of moving water, are deflected around the area between said adjacent piers, said current deflector supported by adjacent said first temporary support posts;

driving sheet pile into the floor to form an upstream wall between said adjacent piers proximate said first temporary support posts;

driving sheet pile into the floor to form a downstream wall between said adjacent piers proximate said second temporary support posts;

the area surrounded by said adjacent spaced piers and said upstream and downstream walls forming a base in said floor;

at least partially covering the base with a tremie seal, such that said tremie seal and adjacent piers serve as an immersed dam foundation;

cutting off at least one of said upstream and downstream walls substantially flush with said adjacent piers;

floating a prefabricated dam structure to a location above said tremie seal and lowering said prefabricated dam structure such that the same rests on the stable anchor points of said adjacent piers; and

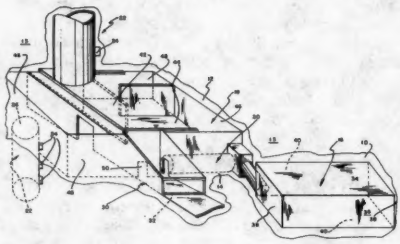
securing said prefabricated dam structure to said adjacent piers and tremie seal with structural tremie concrete to form said dam.

4,881,849

METHOD FOR STORING TOXIC WASTE MATERIAL

Harold C. Hoffine, Box 213, Waverly, Kans. 66871; John Forsythe, 802 W. 15th, and Leon Morgan, R.R. 5, Box 144, both of of, Emporia, Kans. 66801

Filed Oct. 27, 1988, Ser. No. 263,395
Int. Cl.[4] G21F 9/24; R02D 29/00
U.S. Cl. 405—128 **8 Claims**



1. A method for the confinement and isolation of toxic waste material comprising the steps of:

(a) forming a first subterranean excavation;

(b) forming a second subterranean excavation;

(c) forming a subterranean tunnel between said first subterranean excavation and said second subterranean excavation;

(d) forming a first subterranean housing means within said first subterranean excavation, said first subterranean housing means having a silo means extending to a surface of the earth and said silo means has a silo door means that can slidably close and open to expose the silo means to the atmosphere;

(e) forming a second subterranean housing means in said second subterranean excavation;

(f) extending a tunnel housing means through said subterranean tunnel from said first subterranean housing means to said second subterranean housing means;

(g) opening the silo door means to expose the silo means and the first subterranean housing means to the atmosphere;

(h) passing toxic waste material through said silo means, through said first subterranean housing means, and through said tunnel housing and into said second subterranean housing; and

(i) closing said silo door means in order to enclose, confine, and isolate said toxic waste material.

4,881,850

SUBSEA GUIDEBASE

William A. Abreo, Jr., 6727 Grovewood La., Houston, Tex. 77008

Filed Sep. 1, 1988, Ser. No. 239,405
Int. Cl.[4] E21B 33/038
U.S. Cl. 405—169 **6 Claims**

1. A subsea landing base comprising:

a central annular housing support structure,

a plurality of guide posts, and

a frame connecting said guide posts to said housing support structure,

said support structure having:

a split seat ring,

means for actuating said split seat ring into a housing supporting position,

means for retaining said split seat ring in its housing supporting position, and

means for releasing said retaining means to allow retraction of said split seat ring,

wherein said retaining and releasing means includes:

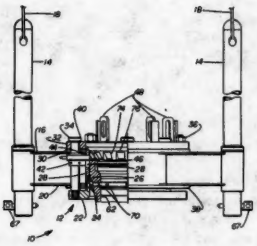
an upper annular plate supported by said frame,

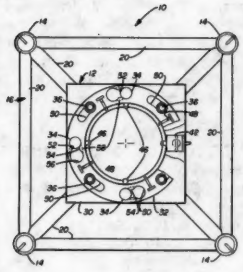
an annular control plate positioned above said upper plate,

an annular lower plate spaced below said upper annular plate,

a plurality of carrier pins secured to said lower plate and extending upwardly through said upper plate and said control plate and having heads engaging the upper surface of said control plate when said split seat ring is in its housing supporting position,

means connecting said upper plate to said control plate





to limit vertical movement of said upper plate and said control plate with respect to each other, and

a plurality of openings in said control plate through which said carrier pins extend allowing said control plate to be rotated relative to said upper plate and to be raised without raising said carrier pins, which raising withdraws the actuating means from its position retaining the split seat ring in its housing supporting position.

4,881,851

CONNECTING ELEMENT FOR OFFSHORE DRILLING RIG

Franz Gantke, Dortmund, Fed. Rep. of Germany, assignor to Georg Fischer AG, Schaffhausen, Switzerland

Filed Aug. 5, 1988, Ser. No. 229,017

Claims priority, application Fed. Rep. of Germany, Aug. 7, 1987, 3726247

Int. Cl.[4] E02B *17/08*

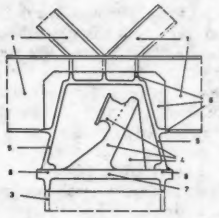
U.S. Cl. 405—204 **13 Claims**

1. A connecting element disposed between a pipe scaffolding and a drilling platform of an offshore drilling rig, comprising

first and second interconnected parts,

said first part comprising a closing head for attachment to an upper portion of said pipe scaffolding, said closing head having a supporting surface, and lifting bitt extending upwardly from said closing head,

said second part comprising a hollow cover for attachment to a lower portion of said drilling platform, said cover including a hollow chamber for enveloping said lifting



bitt, said cover being supported by said supporting surface and being interconnected to said closing head.

4,881,852

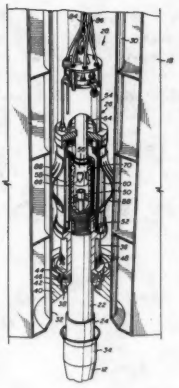
METHOD AND APPARATUS FOR TENSIONING THE TETHERS OF A TENSION LEG PLATFORM

Richard H. Gunderson, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed Jan. 22, 1988, Ser. No. 146,989

Int. Cl.[4] E02B *17/00*; B63B *35/44, 21/50*

U.S. Cl. 405—224 **36 Claims**



1. A tension leg platform, comprising:

a foundation element secured to an ocean bottom location;

a plurality of elongate, substantially vertical tethers, each of said tethers having a lower end secured to said foundation element and an upper end reaching a preselected distance below the ocean surface;

a buoyant hull positioned at the ocean surface above said tethers, said hull having a plurality of vertically extending columns, the upper end of each tether being secured to the lower portion of a corresponding column; and

a tether tensioning and securing system having:

at least one tether tensioning tool and means for lowering said tensioning tool to a position proximate the lower portion of at least one column and for releaseably securing said tensioning tool to any tether within the group of said tethers corresponding to said column, whereby a plurality of said tethers can be individually tensioned by a single tensioning tool without the need for any form of tether connector extending to the top of the column.

30. A method for installing a tension leg platform at an offshore location, said method comprising the steps of:

a. establishing a foundation for said tension leg platform on the ocean floor at said offshore location;

b. securing a plurality of tethers in substantially vertical orientation to said foundation, said tethers each having a lower end secured to said foundation and an upper end situated a spaced distance below the ocean surface;

c. positioning a tension leg platform hull above said foundation, said hull having a draft which is less than the distance from the ocean surface to the upper ends of said tethers, whereby clearance exists between the upper ends of said tethers and the bottom of said hull;

d. securing a moveable tether tensioning tool to the upper end of a first rigid tether extender supported by said hull;

e. lowering said rigid tether extender from said hull to the upper end of a corresponding one of said tethers;

f. securing said rigid tether extender to the upper end of said corresponding tethers;

g. biasing said tether extender upward with said tensioning tool until the corresponding tether reaches a preselected tension level;

h. locking said tether extender against downward motion relative to said hull; and

i. moving said moveable tether tensioning tool to a secured tether extender and repeating steps e–h for a corresponding second tether.

4,881,853

SUPPORT SECTION FOR MINES AND TUNNELS

Günter Benning, Bruchweg 20, D 4350 Recklinghausen, Fed. Rep. of Germany

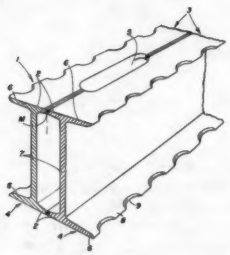
PCT No. PCT/EP87/00448, § 371 Date Jun. 27, 1988, § 102(e) Date Jun. 27, 1988, PCT Pub. No. WO88/01680, PCT Pub. Date Mar. 10, 1988

PCT Filed Aug. 14, 1987, Ser. No. 196,214

Claims priority, application Fed. Rep. of Germany, Aug. 28, 1986, 3629214

Int. Cl.[4] E21D *17/00*

U.S. Cl. 405—288 **12 Claims**



1. A support section for a mine and tunnel support, comprising: two I-section portions, each I-section portion having abutting upper and lower inner I-flanges, each inner I-flange having an outer edge joined to a cooperating inner I-flange to form a box section, said box section having installation slots in both said upper inner I-flange and in said lower inner I-flange, said installation slots being arranged at spaced locations along a central longitudinal axis of said upper and lower inner I-flanges and the slots of said upper and lower inner I-flanges being arranged such that slots of adjacent upper inner I-flanges and slots of adjacent lower inner I-flanges coincide forming installation recesses.

4,881,854

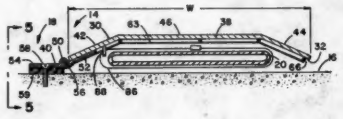
PRESSURE ACTIVATED FLUID RETAINING SYSTEM AND METHOD

Gerald J. Bowe, Eau Claire, Wis., assignor to JBI Corporation, Osseo, Wis.

Filed Aug. 17, 1988, Ser. No. 233,234

Int. Cl.[4] E02B *7/00*

U.S. Cl. 405—303 **26 Claims**



1. A system for retaining liquids within an enclosure comprising:

(a) threshold means for retaining liquids within an enclosure, the threshold means being located on a base surface of the enclosure and comprising a rigid upper surface, a rigid lower surface, and two end sections, the threshold means being movable between a first horizontal position and a second vertical position;

(b) a flexible inflatable member in the form of hose means positioned beneath the threshold means; and

(c) means for pressurizing the hose means so that the pressurization and expansion of the hose means imparts movement to the threshold means and positions the threshold means to retain liquids within the enclosure.

4,881,855

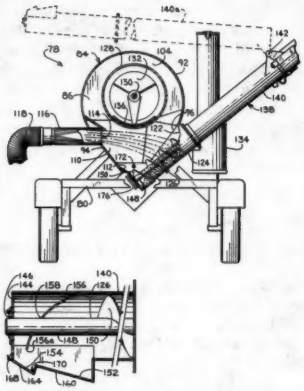
VACUUM PARTICULATE TRANSFER APPARATUS

Frank Rempel; Clarence M. Zacharias, and Linden G. Maxwell, all of Swift Current, Canada, assignors to Rem Manufacturing Ltd., Swift Current, Canada

Filed Aug. 9, 1988, Ser. No. 230,333

Int. Cl.[4] B65G *53/48*

U.S. Cl. 406—53 **17 Claims**



1. A high-efficiency, pneumatic bulk loader for granular materials comprising:

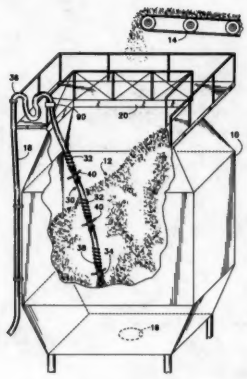
a mobile chassis adapted to be positioned adjacent materials to be loaded;

a hollow body mounted on said chassis and defining an internal, air-materials separating chamber,

said body including a pair of oppositely disposed, generally upwardly projecting

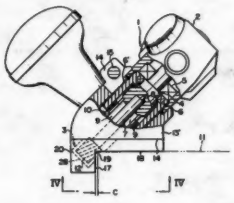
sidewalls presenting opposed extremities of said chamber;
an inlet in one of said sidewalls;
a pickup conduit coupled with said inlet through which materials may be directed into the chamber;
suction mechanism carried by the chassis and communicating with said chamber for drawing an air stream through the conduit to entrain the materials and propel them into the chamber through the inlet;
an outlet in the other sidewall of the body opposite said inlet;
means within said separating chamber for allowing the air stream to escape from the chamber while the momemtum of the materials carries the same across the width of the chamer and charges them into said outlet;
a discharge conveyor operably coupled with said outlet for transferring materials charged into the outlet to a remote location; and
means for sealing said discharge conveyor against the substantial entry of ambient air during operation of the discharge conveyor and said suction mechanism whereby to prevent significant diminution of the strength of the air stream created by said mechanism.

4,881,856
CHIP SNAKE
Randall K. Greig, 936 Cascade Dr., Longview, Wash. 98632
Filed Oct. 5, 1987, Ser. No. 104,426
Int. Cl.[4] B65G *53/40*
U.S. Cl. 406—134 **20 Claims**



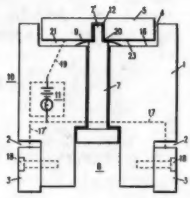
1. A device for dislodging impacted material comprising:
a flexible hose having a first end and a second end, the first end being adapted for coupling to a source of compressed air such that compressed air may be introduced into said hose at the first end and delivered at the second end thereof, wherein the hose comprises a plurality of hose segments disposed in end-to-end relationship and a plurality of interconnect pipes coupling ones of said plurality of hose segments, said interconnected pipes being joined to adjacent ends of said hose segments, and
air nozzle means attached to the second end of said hose for expelling compressed air therefrom causing said device to undulate under the influence of the expulsion of compressed air,
said undulation of said device being effective to cause said device to strike and dislodge said impacted material.

4,881,857
MACHINE FOR CHAMFERING THE CORNER OF AN OBJECT TO BE PROCESSED
Yutaka Tanaka, and Kenji Fukuda, both of Tokyo, Japan, assignors to Nitto Kohki Co., Ltd., Tokyo, Japan
Filed Dec. 29, 1988, Ser. No. 291,598
Claims priority, application Japan, Jan. 14, 1988, 63-3639[U]
Int. Cl.[4] B23C *3/12*; B27C *5/10*
U.S. Cl. 409—138 **8 Claims**



1. A machine for chamfering the corner of an object comprising:
a body having a bottom surface portion;
a rotating cutter arranged in the body, said rotating cutter being projected from and slanted relative to the bottom surface portion;
a slide guide rotatably supported on said bottom surface portion and having guide planes which are perpendicular to each other and slidable along the corner of the object, a space being formed between said guide planes, into which space at least a portion of cutting blades of the rotating cutter projects;
a slot formed in said body;
a stopper screw which is screwed through said slot into said slide guide; and
wherein adjustment means for moving a portion of the stopper screw are provided within said slot to thereby adjust the cutting blades projecting into the space.

4,881,858
TOOL OFFSET INDICATOR
Karl G. Volk, and William J. Delisle, both of San Jose, Calif., assignors to Semprex Corporation, Campbell, Calif.
Filed Mar. 16, 1987, Ser. No. 25,969
Int. Cl.[4] B23Q *15/22*
U.S. Cl. 409—218 **13 Claims**



1. A tool offset indicator comprising: a rigid, generally rectangular block having predetermined dimensions, said block having first and second opposing flat surfaces;
a rigid, generally flat electrically conductive movable plate;
first means for compressibly mounting said movable plate to said first flat surface;
a rigid, generally flat electrically conductive plate assembly;
second means for rigidly mounting said plate assembly to said second flat surface; and

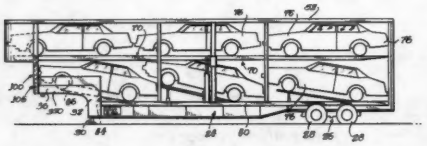
indicator means coupled to said movable plate and to said rigidly mounted plate assembly for providing an indication when a tool cutting edge contacts either said movable plate or said rigidly mounted plate assembly, said tool cutting edge completing an electrical circuit providing power to said indicator means when said tool cutting edge contacts either said movable plate or said rigidly mounted plate assembly.

4,881,859

TRAILER FOR SELECTIVELY TRANSPORTING VEHICLES AND GENERAL FREIGHT

Rodney P. Ehrlich, Monticello, Ind., assignor to Wabash National Corporation, Lafayette, Ind.

Filed Oct. 6, 1988, Ser. No. 253,443
Int. Cl.[4] B60P *3/08*
U.S. Cl. 410—29.1 **9 Claims**



6. A trailer comprising a continuous floor and means supporting said floor for selectively carrying general freight and a number of automobiles, said floor including an elevated forward floor section for overlying a tractor to be coupled to said trailer and a level lower rear floor section, selectively extendable and retractable ramps means on said floor for supporting said automobiles in lineally overlapping relationship and inclined with respect to said floor upon extensions of said ramp means, a forward endwall and sidewall means extending upwardly from said floor said forward endwall including a forwardly projecting bay spaced above said floor for accommodating an end portion of an automobile supported on said deck, wherein said trailer includes spaced apart rear wheels adjacent opposite sides thereof, and an elongate, unitary upper deck coextensive with said floor for supporting the same number of automobiles as on said floor and in an end to end array, said upper deck being selectively positionable between an inclined, automobile-loading position, and a horizontal and elevated automobile-transporting position, and being elevatable to a raised storage position, said means supporting said floor comprising longitudinally extending outside beam elements having an upper edge supporting said floor and extending below an upper reach of said rear wheels, and having a lower edge substantially below an upper reach of said rear wheels, longitudinally extending inside beam element having an upper edge supporting said rear floor section at a height above a top of said rear wheels, said inside beam elements including a portion extending inwardly of and directly between said rear wheels and having a lower edge substantially below an upper reach of said rear wheels.

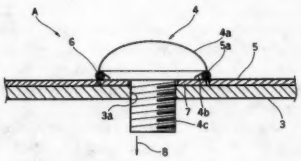
4,881,860

COVER PLATE RETAINING STRUCTURE

Hideki Kanazawa, 880, Sekishi-cho, Hamamatsu-shi, Shizuoka, 431-31, Japan

Filed Feb. 3, 1988, Ser. No. 152,014
Claims priority, application Japan, Feb. 10, 1987, 62-29125
Int. Cl.[4] F16B *13/06, 21/18*
U.S. Cl. 411—55 **3 Claims**

1. A fixing structure of the type wherein a cover plate is retained on a fixed member by a screw engagement member which is screwed in a through hole formed in said cover plate and has a larger diameter than the outer diameter of said screw engagement member, said retaining structure being characterized in that comprising a ring-shaped engaging member having a circular sectional view which is formed by elastic material having a free size outer diameter nearly equal to or smaller than a diameter of said through hole of said cover plate and being expandable in a radial direction, said screw engagement member which is mounted beforehand on said fixed member and has an inclined surface on a bottom outer edge portion, and a washer having a thickness nearly equal to that of said cover plate which is coupled beforehand with said screw engagement member for supporting said engaging member, and said



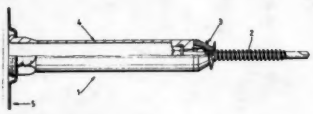
bottom outer edge of said screw engagement member is brought into contact with an inner surface of said ring-shaped engaging member, and said screw engagement member is turned in a screw-in direction against said fixed member to cause said ring-shaped engaging member to be expanded in a radial direction so that said ring-shaped engaging member and upper edge portion of said through hole of said cover plate are engaged and said cover plate is securely fixed on said fixed member.

4,881,861

FASTENING ASSEMBLY

George D. Hewison, Aldershot, Hants, Great Britain, assignor to ITW Limited, England

Filed Aug. 25, 1988, Ser. No. 236,532
Claims priority, application United Kingdom, Sep. 8, 1987, 8721049
Int. Cl.[4] F16B *35/02*
U.S. Cl. 411—383 **10 Claims**



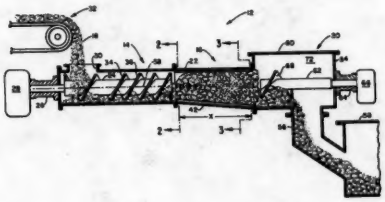
1. A fastening assembly for fastening a waterproof membrane and thick insulation to a roof deck, said fastening assembly comprising a screw threaded fastener, a driving head located at one end of said screw threaded fastener, a screw thread located on said screw threaded fastener, a clamp plate for spreading a clamping load of said. fastening assembly over an area of said waterproof membrane, a clamp tube having a head and a foot, said foot of said clamp tube being arranged to be engaged and held by said head of said screw threaded fastener and said head of said clamp tube being arranged to engage and hold said clamp plate, and an expanding auger, said expanding auger being formed between said screw thread of said screw threaded fastener and said foot of said clamp tube, in use, said auger rotating with said fastener to expand a hole in said waterproof membrane through which said fastener is inserted whereby said hole accommodates said clamp tube of said fastening assembly.

4,881,862

SCREW SEAL

David S. Dick, San Luis Obispo, Calif., assignor to Jenike & Johanson, Inc., No. Billerica, Mass.

Filed Sep. 30, 1987, Ser. No. 103,182
Int. Cl.[4] B65G *53/48*
U.S. Cl. 414—218 15 Claims



1. A screw seal comprising, in combination,

a housing comprising an elongate tubular conveying section and an elongate tubular sealing section, one end of each section being joined to one end of the other, the conveying section having an inlet opening longitudinally spaced from its joined end for receiving a stream of bulk solids,

a discharge chamber connected to the other end of the sealing section,

feed screw means within the conveying section and extending between the inlet opening and said joined ends,

means to rotate the feed screw means to cause flow of the solids to and through the sealing section to said chamber, said flow being variable between predetermined highest and lowest operating solids flow rates,

means for producing and maintaining a gas pressure differential between said chamber and the inlet opening during said flow, the sealing section having a cross sectional area diverging toward said other end, said divergence being greater below than above a horizontal plane defined by diametrically opposed longitudinal lines in the sealing section, said divergence and the length of the sealing section being related so that during said flow the coefficient of friction between the solids and the wall of the sealing section causes compression of the solids, said compression forming a plug having a density limiting the flow of gas between the discharge chamber and the inlet opening to a predetermined maximum leakage rate during flow of the solids between said highest and lowest rates, and

means to break up the plug as it is discharged into said chamber.

4,881,863

APPARATUS FOR INSPECTING WAFERS

Sidney Braginsky, Dix Hills, N.Y., assignor to Primary Systems Corporation, Danbury, Conn.

Filed Dec. 17, 1987, Ser. No. 134,012
Int. Cl.[4] B65H *5/12*
U.S. Cl. 414—225 12 Claims

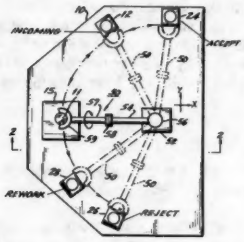
1. Apparatus for inspecting a wafer, comprising:

optical means for optically viewing a wafer, including an objective lens and a viewing device that are interconnected by an optical link;

robot arm means for receiving the wafer from an incoming location, laterally transporting the wafer to an inspection location for viewing by the objective lens, and then placing the wafer in an outgoing location after inspection;

the robot arm means including a gripping device for continually gripping the wafer during its transit from the incoming to the outgoing location;

the optical link including means for optically rotating as necessary a wafer image received by the objective lens so as to transmit to the viewing device a wafer image with a desired angular orientation; and



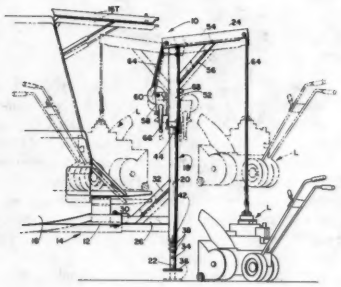
means for supporting the robot arms means and the optical means, including scanning means for scanning the objective lens across the wafer when the wafer is in the inspection location.

4,881,864

BOOM HOIST FOR ATTACHMENT TO A TRAILER HITCH DRAWBAR

Joseph G. Amato, Brighton, Colo., assignor to Hitch Lift, Inc., Brighton, Colo.

Filed Nov. 9, 1987, Ser. No. 118,563
Int. Cl.[4] B60R *9/00*
U.S. Cl. 414—543 9 Claims



1. For use with a load-carrying vehicle equipped with a hollow rectangular drawbar extending rearwardly therefrom as part of a hitch, the boom-type hoist which comprises: a rigid tubular stanchion; a rectangular tongue projecting forwardly from said stanchion intermediate the ends thereof for telescopic engagement with the drawbar, said tongue when so engaged cooperating with the drawbar to maintain the stanchion in an upright position with the lower end thereof raised off the ground; means detachably interconnecting said tongue and drawbar in telescoped relation; means comprising a retractable foot telescoped into the lower end of the stanchion for movement between an extended ground-engaging position supporting the stanchion together with any load carried thereby and a retracted position elevated clear of the ground; a collar mounted on said stanchion, said collar having a top surface; a sleeve telescopingly receiving said stanchion and being movable axially of said stanchion, said sleeve having an upper end and a lower end with said sleeve lower end resting on top of said collar top surface to be supported thereby on the upper end of the stanchion for relative rotational movement; a rigid arm projecting from said sleeve upper end and cooperating therewith to define a rotatable boom having a remote end; and winch means having a cable wound thereon mounted on

the sleeve for rotational movement therewith, said winch cable having a portion thereof reaved along the boom and over its remote end into position for attachment to a load, said elements cooperating with one another to define a hoist for raising a load off the ground and swinging it into the load-carrying vehicle, and said foot in retracted position permitting the load-carrying vehicle and any load carried therein to be transported from place to place while the hoist remains attached to the latter.

4,881,865

FOREST MACHINE WITH CRANE

Olof Herolf, Sundsvall, Sweden, assignor to OSA AB, Alfta, Sweden

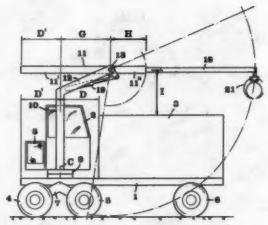
PCT No. PCT/SE87/00271, § 371 Date Apr. 7, 1988, § 102(e) Date Apr. 7, 1988, PCT Pub. No. WO87/07474, PCT Pub. Date Dec. 17, 1987

PCT Filed Jun. 9, 1987, Ser. No. 149,226

Claims priority, application Sweden, Jun. 12, 1986, 8602629-1

Int. Cl.[4] A01G *23/08*; B60P *1/54*

U.S. Cl. 414—550 **19 Claims**



1. A crane-type forest machine comprising a crane and a wheeled chassis having width, length and depth dimensions, sides and a front, the chassis having at least a pair of opposed, spaced apart front wheels, a driver's cab mounted on said wheeled chassis over said front wheels; a load carrier having a length disposed behind said cab and on the chassis; a rotatable crane post mounted for rotation about a vertical axis, relative to said chassis; said crane post comprising a pair of spaced apart upwardly extending arms, one on each side of the cab, each of said arms including an inclined end portion, said end portions extending in spaced apart relationship; a rotatable shaft extending transversely between said inclined end portions and being rotatable about a horizontal axis; means for rotating said shaft about said horizontal axis; said shaft being spaced above and positioned a distance from said vertical axis greater than the minimum distance from said vertical axis to the sides and front of said chassis; a boom mounted intermediate its ends on said shaft whereby said boom is rotatable about said horizontal axis; an extension boom associated with said boom; and means for extending and retracting said extension boom; whereby said arms can be pivoted about said vertical axis and said boom pivoted about said horizontal axis to extend vertically at any position along said sides and front of the chassis to reach the ground level at the sides and front of the chassis.

4,881,866

GLASS HANDLING APPARATUS

John R. Harmon, Genoa, Ohio, assignor to Libbey-Owens-Ford Co., Toledo, Ohio

Filed Jun. 21, 1988, Ser. No. 209,524

Int. Cl.[4] B66F *9/18*

U.S. Cl. 414—607 **13 Claims**

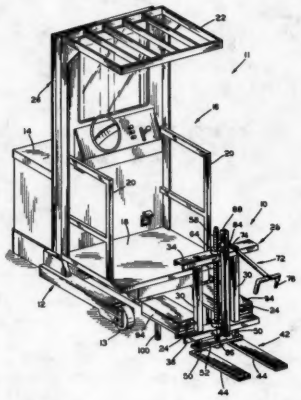
1. Apparatus for handling fragile sheet material comprising:

a frame;

means for attaching said frame to a transport mechanism;

sheet support means for supporting a lower edge of the sheet material; and

adjusting means operatively connecting said sheet support means to said frame for effecting vertical adjustment of



said sheet support means relative to said frame said adjusting means including an elongate screw having one end connected to said sheet support means and a nut affixed to said frame threadably receiving said elongate screw.

4,881,867

EXCAVATOR ATTACHMENT

Stuart A. Essex, and Wendy P. Essex, both of 3 Kambalda Place, Yarrawarrah, New South Wales, Australia (2232)

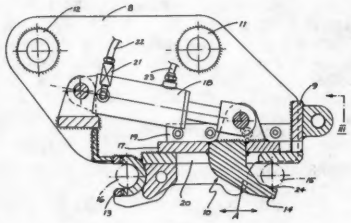
PCT No. PCT/AU87/00322, § 371 Date Jun. 10, 1988, § 102(e) Date Jun. 10, 1988, PCT Pub. No. WO88/02421, PCT Pub. Date Apr. 7, 1988

PCT Filed Sep. 22, 1987, Ser. No. 240,190

Claims priority, application Australia, Oct. 3, 1986, PH08317

Int. Cl.[4] E02F *9/00*

U.S. Cl. 414—723 **4 Claims**



1. A hinge assembly for mounting onto the articulated arm of a hydraulic excavator, backhoe or other excavating machine, the assembly comprising a housing and a remotely operable pair of oppositely directed jaws which are adapted to releasably grip the transverse hinge pins of a bucket, rock hammer or other operating tool for the machine, one of said jaws being fixed and the other being movable between a withdrawn position in which said jaws can be fitted between said hinge pins and an extended position in which said pins are grasped by the jaws, the inner face of said movable jaw being inclined at an acute angle away from an opposite face to provide a wedging action against said opposite face which serves to lock the hitch assembly onto the pins as said movable jaw is

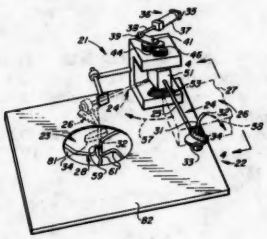
displaced to said extended position, both said jaws at all times protruding clear of said housing with said movable jaw being mounted on a slide plate within said housing and said movable jaw protruding clear of said housing through an aperture directly below the slide plate.

4,881,868

APPARATUS AND METHOD FOR RAPID TRANSPORT OF AN ELASTIC BAND

Daniel Alameda, Pacific Grove, and Scott Cooper, Salinas, both of Calif., assignors to Rubber Band Technology, Yakima, Wash.

Filed Sep. 19, 1988, Ser. No. 245,625
Int. Cl.[4] B25J *18/00*
U.S. Cl. 414—773 **17 Claims**



1. An apparatus for rapid transport of an elastic band comprising:

a movable arm assembly having finger means thereon dimensioned to loosely receive said band therearound;

drive means coupled to move said arm assembly from a band loading station to a relatively spaced apart band unloading station;

said arm assembly further being movable by said drive means from a first orientation of said finger means for gravity assisted mounting and support of said band on said finger means at said loading station to a second orientation of said finger means for gravity assisted demounting of said band therefrom at said unloading station; and

said arm assembly being driven by said drive means between said first orientation and said second orientation along a path maintaining said band on said finger means against dynamic forces acting on said band during acceleration, transport and deceleration of said band and reorientation of said finger means.

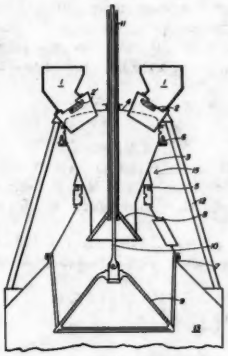
4,881,869

FURNACE CHARGING THROAT CONSTRUCTION

Bernhard Heuncken, Oberhausen; Burno Kämmerling, Dinslaken; Eckhard-K. Scholz, Bottrop; Wolfgang Schroeder, Oberhausen, and Hans Krause, Moers, all of Fed. Rep. of Germany, assignors to Man Gutehoffnungshuette GmbH, Fed. Rep. of Germany

Division of Ser. No. 100,526, Sep. 24, 1987, abandoned. This application May 17, 1988, Ser. No. 195,116
Claims priority, application Fed. Rep. of Germany, Sep. 26, 1986, 3632724
Int. Cl.[4] C21B *7/18*; E27B *1/20*
U.S. Cl. 414—786 **8 Claims**

1. A method for operating a throat stopper for charging a shaft-type furnace which throat stopper has a hood member supported in an uppermost stationary position and includes at least one charging container with a flap valve directed to an upper sluice hopper which is rotatably supported below said hood member and is releasably sealable therewith to provide a pressure tight vessel and which also includes a first distributor bell member suspended so as to open and close the lower end of said upper sluice hopper, comprising charging said upper sluice hopper with material through said at least one charging container by opening the flap valve, rotating the upper sluice hopper after charging has begun with the upper sluice hopper and hood member in unsealed condition, ceasing said rotation,



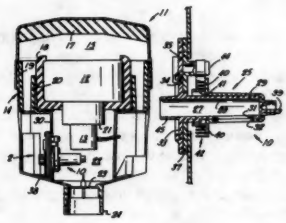
closing the flap valve and sealing an upper portion of said upper sluice hopper with a bottom portion of said hood after said rotation has ceased and permitting said upper sluice hopper to act as a sluice chamber.

4,881,870

AIR BLOWER SAFETY CONTROL

Gregory A. Ritter, Leucadia; Graham Barton, Carlsbad, and Ronald J. Sargent, Escondido, all of Calif., assignors to Alopex Industries, Inc., San Marcos, Calif.

Filed Nov. 15, 1988, Ser. No. 271,611
Int. Cl.[4] F04D *29/58*
U.S. Cl. 415—47 **7 Claims**



1. In an air blower assembly providing air under pressure to a spa, and including a blower having an air intake and an air outlet, and means defining an outlet passage for delivering air from said air outlet to a spa, the improvement comprising:

a vent valve mounted in said outlet passage and including a first valve member having a first vent port therein for communicating with the outlet passage, and a second valve member having a second vent port therein, said first and second valve members being relatively rotatable from a normal position in which said first member overlies and closes said first vent port to an open position in which said second vent port is aligned with said first vent port, and second said valve member having a passage communicating between said second port and the outside of said outlet passage;

and a bi-metallic coil disposed around said vent valve and having one end connected to said first valve member and an opposite end anchored in said blower assembly, said coil being set to hold said valve member with said second

port spaced from said first port while the temperature is below a preselected opening temperature, and to rotate said valve member and bring said second port into overlapping relation with said first port when the temperature increases to said opening temperature, thereby to provide a vent for the escape of air from said outlet passage to release the pressure in the outlet passage, and to increase the air flow through the blower and past the motor.

4,881,871

PERIPHERAL PUMP

Erhard Wunderlich, Munich, Fed. Rep. of Germany, assignor to Speck-Pumpenfabrik, Walter Speck KG, Roth, Fed. Rep. of Germany

Filed Apr. 11, 1988, Ser. No. 180,330

Claims priority, application Fed. Rep. of Germany, Apr. 10, 1987, 3712165

Int. Cl.[4] F01D *5/14*

U.S. Cl. 415—119 **8 Claims**

1. A peripheral pump with an impeller ring comprising two blade rings on each side of a central web, and further comprising a housing and a conveyance channel which extends from a suction aperture and passes through at least one flow duct and impeller blades in the housing to a discharge orifice, wherein the spacing between at least one adjacent pair of blades in each impeller ring is different than the spacing between at least one other pair of blades on the same ring, said impeller blades extending substantially radially in respect to the respective circumference of said rings.

4,881,872

STEAM TURBINE FOR PART LOAD OPERATION

Jürg Bütikofer, Niedererlinsbach, and Hans Meyer, Fislisbach, both of Switzerland, assignors to BBC Brown Boveri AG, Baden, Switzerland

Filed Jun. 20, 1988, Ser. No. 208,502

Claims priority, application Switzerland, Jun. 26, 1987, 2426/87

Int. Cl.[4] F01D *9/04*

U.S. Cl. 415—143 **5 Claims**

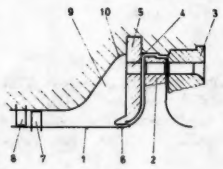
1. A steam turbine designed to maximize efficiency in a part load range, comprising:

a nozzle group for directing steam into the turbine;

a control wheel arranged in the path of steam directed into the turbine from the nozzle group;

a transition duct arranged downstream of the control wheel;

means arranged between the control wheel and the transition duct for imparting a swirl onto a flow from the control wheel into the duct so as to equalize the flow within the duct; and



reaction blading arranged downstream of the transition duct for extracting useful energy from the equalized flow.

4,881,873

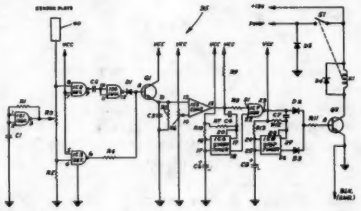
CAPACITANCE LEVEL SENSOR FOR A BILGE PUMP

Leonard S. Smith, Richfield, and Gary L. Cook, Bloomington, both of Minn., assignors to Altus Technology Corporation, Minnetonka, Minn.

Filed Dec. 14, 1988, Ser. No. 284,172

Int. Cl.[4] F04B *49/02;* **F04D** *27/00;* **G01R** *27/26*

U.S. Cl. 417—12 **9 Claims**



1. An automatic bilge pump control device in connection with a bilge pump, having in combination

a sensor plate,

an oscillator injecting an alternating wave signal into a balanced voltage divider comprising a passive and active pair of detectors outputting identical square wave signals,

a resistor,

the passive one of said detectors being grounded through said resistor,

the active one of said detectors being in circuit with said sensor plate and its square wave signal being inverted 180° relative to said other detector,

a phase shift detecting integrating transistor in circuit with said voltage divider having said wave signals coupled thereto,

an integrating capacitor charged by said integrating transistor in direct proportion to any phase shifting detected,

said phase shifting being responsive to the presence of bilge water in sufficiently close proximity to said sensor, and

means responsive to said phase shifting detected causing said pump to operate.

4,881,874

TAIL ROTOR

Billy P. White, Arlington, and Dwayne E. Morrison, Rowlett, both of Tex., assignors to Bell Helicopter Textron Inc., Fort Worth, Tex.

Filed Mar. 31, 1988, Ser. No. 175,770

Int. Cl.[4] B64C *27/36*

U.S. Cl. 416—138 **7 Claims**

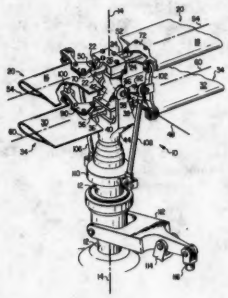
1. A helicopter tail rotor comprising:

a drive mast having an axis of rotation;

a first blade pair mounted for rotation about said drive mast

axis of rotation, said first blade pair having a pitch change axis perpendicularly disposed to said drive mast axis of rotation; and

a second blade pair mounted for rotation about said drive mast axis of rotation and being spaced apart from and



parallel disposed to said first blade pair, said second blade pair having a pitch change axis parallel to said pitch change axis of said first blade pair and being rotatable in the same direction as said first blade pair about said drive mast.

4,881,875

BOUNDARY LAYER CONTROL IN SUPERSONIC NOZZLE

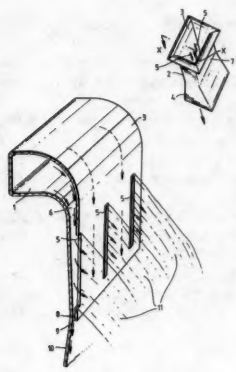
Richard C. Adkins, Milton Keynes, United Kingdom, assignor to British Aerospace PLC, London, England

Filed May 5, 1988, Ser. No. 190,654

Claims priority, application United Kingdom, May 6, 1987, 8710733

Int. Cl.[4] F04F *5/46*

U.S. Cl. 417—54 **8 Claims**



8. A method of pumping a secondary gas through a duct having an inlet and an outlet by injecting primary gas into the duct to entrain the secondary gas and draw the secondary gas in through the inlet and expel it from the outlet, the method comprising injecting primary gas into the duct by passing it at supersonic speeds along a tapering passage that is divided from the duct by a wall having a plurality of elongate slots formed therein that extend in general direction of secondary gas flow, thereby forming a plurality of thin sheet-like jets of primary gas extending into the duct, wherein the direction of flow of primary gas within the said jets has a component in the said general direction of secondary gas flow through the duct and a component at right-angles thereto, and wherein the method further comprises injecting into the duct a minor proportion of primary gas through a peripheral opening at the end of the passage, the said minor proportion of primary gas passing over a part of the duct wall adjacent to the opening to energize the boundary layer of gas on the duct wall.

4,881,876

DEVICE FOR DETECTING THAT A MEMBRANE IN A MEMBRANE PUMP HAS BROKEN

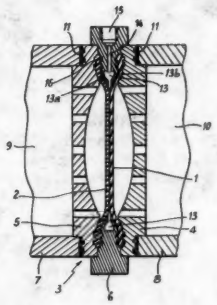
Alain Laziou, Romilly S/Andelle, France, assignor to Dosapro Milton Roy, France

Filed Dec. 14, 1988, Ser. No. 284,629

Claims priority, application France, Dec. 17, 1987, 87 17636

Int. Cl.[4] F04B *43/06, 45/04*

U.S. Cl. 417—63 **4 Claims**



1. A device for detecting that a membrane in a hydraulically actuated membrane pump has broken, the device being constituted by an annular spacer sandwiched between the peripheral zones of at least two adjacent membranes, with the assembly being peripherally clamped between two pump body components, the annular spacer including at least one radial passage providing communication between the space delimited by the two membranes and the outside of the pump, wherein the radial passage opens out into a groove provided in the inside face of the annular spacer, with the walls of the groove converging towards each other.

4,881,877

RADIAL PISTON PUMP

Georg Liska, Zimmerbach, Fed. Rep. of Germany, assignor to Zahnradfabrik Friedrichshafen, AG., Friedrichshafen, Fed. Rep. of Germany

PCT No. PCT/EP87/00109, § 371 Date May 6, 1988, § 102(e) Date May 6, 1988, PCT Pub. No. WO87/05366, PCT Pub. Date Sep. 11, 1987

PCT Filed Feb. 25, 1987, Ser. No. 186,480

Claims priority, application Luxembourg, Apr. 7, 1986, 123

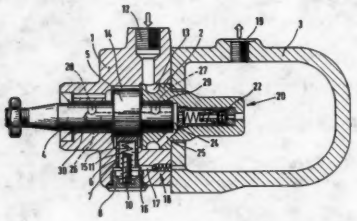
Int. Cl.[4] F04B *1/14*

U.S. Cl. 417—270 **9 Claims**

1. In a multi-piston pump of the kind having a plurality of radially arrayed pistons having means for actuation in sequential order by a drive shaft (4) and including pressure limiting valve means (20) biased to closed position by spring means (21) wherein said pressure limiting valve means is intermediate a pressure-collecting chamber means (3) and an end surface of the drive shaft; with return means (24, 25) for return flow to a suction inlet (12) of the pump upon opening of said pressure limiting valve;

the improvement comprising kinetic to heat energy converting throttle means being disposed to throttle flow from said pressure limiting valve means to said return means

wherein said flow impinges on said end surface of said drive shaft upon opening of such pressure limiting valve means and wherein return flow through said throttle means of initially cold oil is thereby heated and rendered



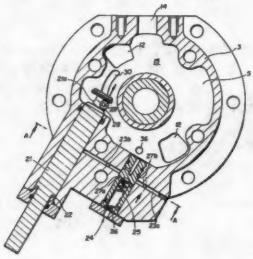
less viscous for recirculating to said suction inlet of said pump and also reducing impact of return oil against the end of said drive shaft for noise reduction in the operation of said pump.

4,881,878

GAS COMPRESSOR OF VARIABLE VOLUME

Takeshi Kobayashi, and Junichi Asai, both of Narashino, Japan, assignors to Seiko Seiki Kabushiki Kaisha, Japan

Filed Aug. 29, 1986, Ser. No. 902,419
Claims priority, application Japan, Sep. 3, 1985, 60-194061
Int. Cl.[4] F04B *49/02*; F04C *29/08*
U.S. Cl. 417—295 **22 Claims**



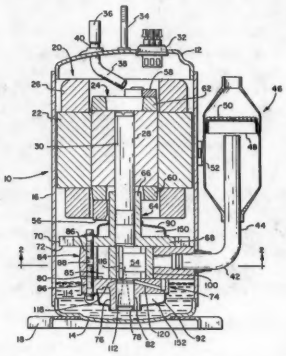
1. A gas compressor of the variable volume type comprising:
a cylinder having a substantially elliptic inner peripheral surface;
a front side block fixed to one end of said cylinder and having communicating gas ports therethrough communicating with the interior of said cylinder, and a rear side block fixed to the other end of said cylinder, the front and rear side blocks cooperating with the cylinder to define a cylinder chamber;
a rotor rotatably mounted in the cylinder chamber and carrying a plurality of vanes mounted to slidably protrude and retract radially of said rotor, the rotor and cylinder chamber cooperating with the vanes to define a compression chamber;
a front head mounted to said front side block and defining therebetween a gas intake chamber;
a rotary plate having at least one gas passage recessed therein,s aid rotary plate being mounted between said front side block and said cylinder to undergo angular displacement within a predetermined angular range; and
driving means for angularly displacing said rotary plate in such a manner as to control the admission of gas to said compression chamber so that the volume of said compression chamber is made variable in accordance with the running speed of the gas compressor, said driving means comprising a hydraulic piston slidably disposed in the front head and having a rear end exposed to the outside atmosphere and a front end exposed to the gas intake chamber and engaged with the rotary plate, and valve means for controlling the flow of pressurized oil applied to the piston rear end by sensing the intake pressure in said intake chamber so as to angularly displace said rotary plate in response to the sensed pressure.

4,881,879

ROTARY COMPRESSOR GAS ROUTING FOR MUFFLER SYSTEM

Arturo L. Ortiz, Tecumseh, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.

Continuation of Ser. No. 138,365, Dec. 24, 1987, abandoned.
This application Mar. 6, 1989, Ser. No. 319,924
Int. Cl.[4] F04B *39/00*
U.S. Cl. 417—312 **18 Claims**



1. A rotary compressor, comprising:
a cylinder block defining a cylinder;
a main bearing and an outboard bearing located on respective ends of said cylinder block and closing said cylinder at each of its opposite ends;
an eccentrically mounted piston means rotationally mounted in said cylinder;
a rotatable crankshaft operably supported by said main and said outboard bearings and drivingly connected to said piston means, the rotation of said piston means in said cylinder resulting in compressed gas within said cylinder;
means for discharging the compressed gas from within said cylinder, comprising a first discharge port in communication with and extending from said cylinder through said main bearing and a second discharge port in communication with and extending from said cylinder through said outboard bearing;
a first discharge muffler and a second discharge muffler mounted on said main and said outboard bearings, respectively, said first and said second discharge mufflers being in fluid communication with said first and said second discharge ports, respectively, whereby compressed gas discharged through said main bearing is expanded upon entry into said first muffler and compressed gas discharged through said outboard bearing is expanded upon entry into said second muffler;
constricting gas passage means communicating between said first and said second mufflers for allowing expanded gas in one of said first and said second mufflers to be constricted and reexpanded upon flowing from said one muffler to the other muffler; and

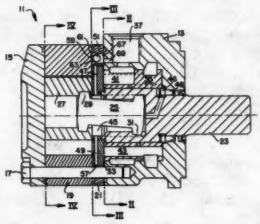
gas discharge outlet means for providing fluid communication between said other muffler and the inside of said housing, said discharge outlet means comprising a plurality of discharge passages, each of said plurality of discharge passages being defined by substantially aligned holes through said main and said outboard bearings and said cylinder block.

4,881,880

DRAIN FOR INTERNAL GEAR HYDRAULIC DEVICE

Andrew N. Dlugokecki, Bridgton, Me., assignor to Parker Hannifin Corporation, Cleveland, Ohio

Filed Apr. 19, 1988, Ser. No. 183,196
Int. Cl.[4] F03C *2/08, 1/113*
U.S. Cl. 418—61.3 **2 Claims**



1. An improved internal gear hydraulic device of the type having a housing with a rotatable valve plate therein which selectively communicates inlet and outlet ports of a commutator with opening and closing fluid chambers between an internal and external gear, the internal gear of which is connected with a drive shaft; the improvement comprising:

a check valve disposed in said housing and having an inlet adjacent said valve plate and an outlet connected to a drain of said internal gear hydraulic device;

said valve plate having a radially inner surface in fluid communication with an area adjacent said shaft and a radially outer surface in communication with the inlet of said check .valve;

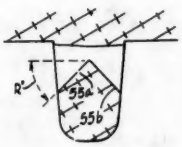
said valve-plate having at least one drain port extending from said radially inner surface to said radially outer surface to allow fluid to be drained from said area adjacent said drive shaft to and through said check valve.

4,881,881

PLUG-RESISTANT ARCH-VENTS FOR A TIRE MOLD

Rene L. Rockarts, Northport, Ala., and Donald R. Bartley, Cuyahoga Falls, Ohio, assignors to The Uniroyal Goodrich Tire Company, Akron, Ohio

Filed Feb. 8, 1988, Ser. No. 153,179
Int. Cl.[4] B29C *33/10*
U.S. Cl. 425—28.1 **4 Claims**



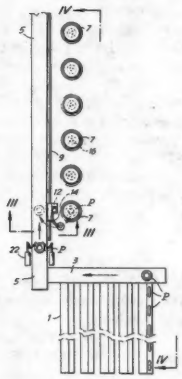
1. In a vented tire mold having a mold body provided with a tire receiving cavity, and with means for producing a preselected tread pattern with a tread ring having lateral and transverse ribs which are provided with arch-vents, each lateral rib having an ar-vent placing individual tread-block forming zones in open communication one with the other, the improvement comprising, each said arch-vent being double wedge-shaped and comprising opposed wedge-shaped passages connected at their apexes formed by downwardly inclined and upwardly inclined upper and lower surfaces, respectively, each lower surface of each wedge-shaped passage being upwardly inclined at from 30° to 50° relative to a longitudinal axis of said vent, so as to form, with said downwardly inclined upper surfaces, a throat having sufficient cross-sectional area to vent air trapped between the upper surface of the tire tread and the inner surface of the tread ring, in a preselected period of time sufficient to seat the outer surface of said tread against the inner surface of said tread ring, said arch-vent being in open communication with a horizontal parting line of the mold which is vented to the atmosphere.

4,881,882

HANDLING DEVICE FOR TIRES TO BE REMOLDED ON VULCANIZATION PRESSES WITH SELECTION FROM DIFFERENT STOCKS OF TIRES

Tosco Fantacci, Pistoia, Italy, assignor to CISAP S.p.A., Pistoia, Italy

Filed May 26, 1988, Ser. No. 199,326
Claims priority, application Italy, May 27, 1987, 9396 A/87
Int. Cl.[4] B29C *35/00, 43/58*
U.S. Cl. 425—38 **13 Claims**



1. A handling device according to claim 2, wherein said predetermined position is a centered position, said means for positioning the tire in a predetermined position includes a pair of stops against which the conveyed tire comes to rest and with respect to which it is centered, and at least one device for simultaneously releasing said stops to allow the centered tire to continue to pass.

4,881,883

SYSTEM FOR CONTINUOUSLY PRODUCING PLATE-SHAPED CATALYSTS

Takashi Michimoto; Saburo Kudo; Kazuhiko Kuwada, and Nobuyoshi Ishida, all of Kure, Japan, assignors to Babcock-Hitachi Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 8, 1988, Ser. No. 165,472
Claims priority, application Japan, Mar. 9, 1987, 62-53686
Int. Cl.[4] B29C *43/58*
U.S. Cl. 425—89 **10 Claims**

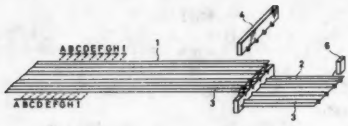
1. An apparatus for continuously producing plate-shaped catalysts, comprising:

a mold press machine having a top die and a bottom die for press-molding a belt-shaped catalyst into a predetermined form, means for moving said top die vertically and recip-

rocally including said top die being connected with a crank mechanism to make the vertical and reciprocal movement of said top die;

a pair of means for delivering the belt-shaped catalyst, provided at the downstream side of said mold press machine and each having means for gripping the belt-shaped catalyst;

grip-delivery control means for controlling said delivering means in accordance with the movement of said crank mechanism so that when one of said pair of delivering means is performing grip and delivery, the other prepares for subsequent grip and delivery so that after grip and delivery of said one pair is completed, a succeeding grip and delivery operation is carried out by the other pair of delivering means and the belt-shaped catalyst is delivered



in response to a delivery signal generated cyclically in accordance with the movement of said crank mechanism;

a cutting device provided at the downstream side of said pair of delivering means for cutting said belt-shaped catalyst into plate-shaped catalysts;

means for detecting that the belt-shaped catalyst, after passing through said cutting device, has reached a predetermined position;

cutting control means for operating said cutting device in response to a signal from said detecting means; and

said grip-delivery control means including means for performing a pass of a signal for delivery of said belt-shaped catalyst and a release of the gripping means when the delivery signal is generated in the midst of operating said cutting device.

4,881,884

APPARATUS FOR INJECTION MOULDING

Roderick M. De'Ath, Oxfordshire, England, assignor to MB Group plc, Reading, England

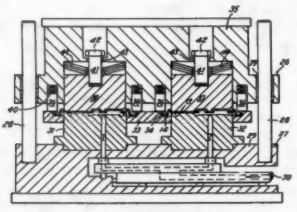
PCT No. PCT/GB87/00842, § 371 Date Aug. 1, 1988, § 102(e) Date Aug. 1, 1988, PCT Pub. No. WO88/04227, PCT Pub. Date Jun. 16, 1988

PCT Filed Nov. 25, 1987, Ser. No. 227,907

Claims priority, application United Kingdom, Dec. 5, 1986, 8629124

Int. Cl.[4] B29C *45/40, 45/14, 33/44*

U.S. Cl. 425—117 **9 Claims**



1. Apparatus for injection moulding plastics closure elements into apertures in the central panels of a plurality of can ends, said apparatus comprising a first mould tool; a second mould tool; means effective to bring the mould tools together to clamp on opposed surfaces of each central panel and thereby define a mould cavity enclosing a margin of panel material around the aperture and spanning both sides of said aperture; and a passageway in at least one of the mould tools to permit injection of plastics material into each said mould cavity, wherein, the first mould tool includes a plurality of cavity defining mould portions each slidably guided in a respective bore in said first mould tool and resilient support means in each bore tourge each said mould portion towards the second mould tool; and the second mould tool includes a plurality of mould inserts each defining a cavity to cooperate with a cavity of a mould portion in the first tool, so that upon closing of the first mould tool to the second mould tool any mould portion closing upon a relatively thick can end panel will be urged, by the cooperating insert, to retract into its bore and permit clamping of a relatively thin can end panel between another mould portion and its cooperating mould insert, and sealing of all the moulds will be established before plastics material is injected into the mould cavity, each mould insert having a passageway through which the plastics material is injected into the mould cavities, the lower tool comprising a hollow block in which the mould inserts are seated and supported and in which a hot runner extends to convey plastics material to the passageways in the mould inserts.

4,881,885

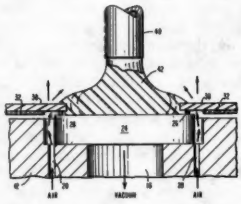
DAM FOR LEAD ENCAPSULATION

Caroline A. Kovac, Ridgefield, Conn.; Peter G. Ledermann, Pleasantville, N.Y., and Luu T. Nguyen, Hopewell Junction, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 15, 1988, Ser. No. 181,843

Int. Cl.[4] H01L *21/56*

U.S. Cl. 425—121 **6 Claims**



1. Apparatus for encapsulating a surface and leads of an electronic device comprising:

a fixture for holding said device,

means to constrain said device to said fixture,

means in said fixture to provide an air dam around said device while it is constrained to said fixture,

means to deliver a metered amount of an encapsulating material to said surface on said device, and

means associated with said air dam to control the spread of said encapsulating material on said surface.

4,881,886

COMPRESSION HEAD FOR MACHINE FOR CONTINUOUSLY DENSIFYING VEGETABLE MATTER

Marcel Neuman, Eumbourg, Belgium, assignor to Biomass Development Europe SA, Brussels, Belgium

Filed May 17, 1988, Ser. No. 194,909

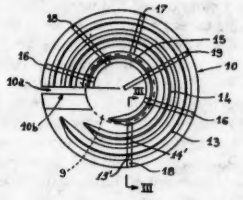
Claims priority, application France, May 26, 1987, 87 07608

Int. Cl.[4] B28B *21/26*

U.S. Cl. 425—208 **14 Claims**

1. In a compression head for machines for continuously densifying vegetable matter and which is mounted by a rod to a conical Archimedean screw and which includes an end disc which is formed of a first material and has a helicoidal front face provided with a plurality of generally circular ribs extending from the leading edge of a slot in the disc and which termi-

nate on the opposite edge of the slot, the improvement comprising friction increasing means formed in the front face of the disc, said friction increasing means being formed of a second material having a higher coefficient of friction than the first material of the disc whereby the friction increasing means will by friction increase the temperature of the vegetable matter acted on by the compression head.

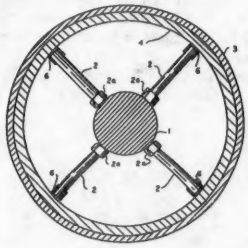


4,881,887

AGGLOMERATION DEVICE

Carl A. Holley, 14315 Tall Oaks, Riverview, Mich. 48192

Filed Jan. 27, 1989, Ser. No. 302,613
Int. Cl.[4] B01J *2/10*
U.S. Cl. 425—222 **5 Claims**



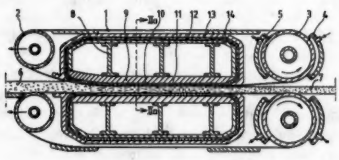
1. In an agglomeration device having a driven shaft and a plurality of pins extending radially outwardly thereof of such length as to sweep closely to the inner surface of the casing of said device; the improvement comprising a layer of high density plastic material attached to the inner surface of said casing, each pin having a ceramic sleeve.

4,881,888

PRESS FOR THE CONTINUOUS PRODUCTION OF BOARDS

Bo Folkesson, Hasslegatan 33, S-542 32 Mariestad, Sweden

Filed Sep. 12, 1988, Ser. No. 242,576
Int. Cl.[4] B30B *5/04*
U.S. Cl. 425—371 **6 Claims**



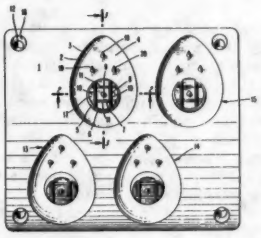
1. A press for the continuous production of boards, in which a board material (6) to be pressed is fed into a press slot between two movable surfaces of which at least one is provided by an endless press belt (1) at the press slot resting on a supporting surface (10) in such a manner that it cannot increase its distance from the opposed moving surface, wherein each press belt (1) and the supporting surface (10) associated therewith define between themselves a passage (11) filled to a maximum capacity thereof with bearing balls and merging into a return passage (12), the balls, when the press is operating, carrying out a complete orbital motion.

4,881,889

ARCUATE MOLD ELEMENT FOR ROTARY DOUGH MOLDER

Albert A. Spiel, Yonkers, N.Y.; James Roe, Wayne, and Henry C. Spanier, West Milford, both of N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.

Division of Ser. No. 235,059, Aug. 23, 1988, which is a continuation of Ser. No. 431, Jan. 5, 1987, Pat. No. 4,795,635, which is a continuation-in-part of Ser. No. 578,040, Feb. 2, 1984, Pat. No. 4,634,597, and a continuation-in-part of Ser. No. 898,187, Aug. 20, 1986, Pat. No. 4,711,425. This application Mar. 31, 1989, Ser. No. 331,354
Int. Cl.[4] B29C *33/42*
U.S. Cl. 425—383 **11 Claims**



1. A mold for use in a rotary molder for dough, comprising:
an arcuate element having a plurality of depressions formed therein, each of said depressions being bounded by a perimeter;
each of said perimeters forming the outline of a foodstuff;
each of said depressions having at least one generally arcuate surface forming the bottoms of said depressions;
at least one of said arcuate surfaces in each depression having at least one raised ridge thereon, each of said ridges lying entirely within said depression and positional to form corresponding grooves in dough which is received in said depressions;
whereby dough passing beneath said mold of said rotary molder is received by said depressions so as to be shaped thereby into a biscuit shape having the outline of said foodstuff and having at least one groove in the upper surface thereof.

4,881,890

MOULDED RESIN ARTICLE

Andrew S. Barry, P.O. Box 515, Hurstville, New South Wales, 2220, Australia

Continuation of Ser. No. 937,556, Dec. 3, 1986. This application Jun. 29, 1988, Ser. No. 212,970
Claims priority, application Australia, Jun. 12, 1985, PH3762
Int. Cl.[4] B29F *1/00*
U.S. Cl. 425—543 **28 Claims**

1. Apparatus for moulding of articles from a reaction setting composition comprising:
means for de-aerating a main or predominating ingredient of said composition, said main ingredient comprising an abrasive filled material, .

means for mixing said main ingredient with a minor ingredient to form a mixture,

means for intermittently flowing said mixture under air-less condition into the bottom of a vented but essentially closed mould cavity defined by a mould assembly, said means for flowing said mixture including a pump comprising:

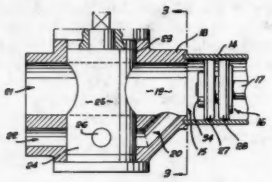
a metering cylinder having an open head-end,

a piston in said cylinder, screw operable for advancement towards and retraction from said head-end,

a cylinder head on said head-end,

an intake port and a discharge port both opening to said head-end and both extending through said head,

a circularly sectioned valve chamber extending through said head and intersecting both said ports,



a plug valve rotatably housed in said chamber and having two angularly phased-apart passages through it respectively able to register with said ports,

means for actuation of said piston and rotation of said plug-valve under control such that when said piston is retracting from said head-end the intake port is open and the discharge port is closed, and when said piston is advancing towards said head-end the intake port is closed and the discharge port is open, said means for flowing providing intermittent flowing of said mixture for a predetermined time to allow for pressure equalization within said mould cavity, and

said mould assembly being adapted to be stripped away from the finished article once setting of said composition has finished.

4,881,891

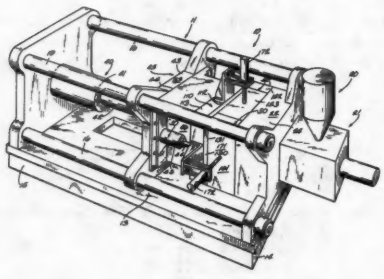
MOLD SIDE WALL LOCKING APPARATUS

LeRoy D. Luther, Brookfield, Wis., assignor to Triangle Tool Corporation, Milwaukee, Wis.

Filed Jan. 11, 1989, Ser. No. 296,184

Int. Cl.[4] B29C *45/66*

U.S. Cl. 425—556 **14 Claims**



1. Apparatus for use in a mold assembly and for selectively restraining a mold side wall against movement away from a molding position, and the mold assembly including an end plate, the apparatus comprising:

a support member selectively moveable along a first path of travel toward and away from the end plate, said support member supporting the mold side wall for slideable movement along a second path of travel substantially perpendicular to the first path of travel and between a mold open position and a mold closed position;

means for moving the support member along the first path of travel toward and away from the end plate; and

a locking member carried by the support member, said locking member being supported for movement with respect to the support member between a retracted position wherein the mold side wall is movable along the second path of travel with respect to the support member and an extended position wherein said locking member is operable to restrain movement of the mold side wall away from the mold closed position when the support member is moved toward the end plate, and releasing the mold side wall for slideable movement toward the mold open position when the support member is moved away from the end plate.

4,881,892

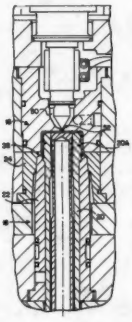
APPARATUS FOR MAKING TAMPER-EVIDENT CLOSURES

Charles A. Webster, Oak Lawn, and Christian J. John, Downers Grove, both of Ill., assignors to American National Can Company, Chicago, Ill.

Filed Oct. 11, 1988, Ser. No. 255,822

Int. Cl.[4] B29C *45/34*

U.S. Cl. 425—577 **2 Claims**



1. A mold for forming a closure including a main body having a skirt which has a tamper-evident band secured to a lower edge by a plurality of frangible connections comprising:

first and second mold portions cooperating to define a closure cavity, said first mold portion defining an outer surface of said closure;

said second mold portion defining an inner surface of said closure; and,

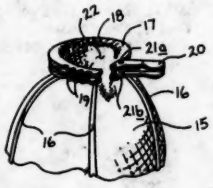
said second mold portion including a hollow core having a knockout pin reciprocated therein and a sleeve surrounding said core, said sleeve and core having tapered portions adjacent said cavity and said core having an annular groove below said tapered portion with communication means between said annual groove and a lower edge of said cavity, said core having axially-extending recesses leading from said groove to accommodate air flow from said cavity.

4,881,893

METALLIC LANTERN MANTLE

John D. Mellini, 304 Fall St., Seneca Falls, N.Y. 13148

Filed Dec. 27, 1988, Ser. No. 290,647
Int. Cl.[4] F21H *1/00*
U.S. Cl. 431—100 5 Claims



1. A metallic mesh mantle for use with a portable fuel burning lantern wherein said lantern includes a gas outlet pipe for deliverance of said fuel, said mantle comprising,

a sack-shaped mantle formed with an open end, said mantle formed of an elongate configuration and of a fine metallic mesh, and

a metallic clamping means secured about the open end of the mantle for adjustable securement about the outlet pipe of said lantern wherein said metallic clamping means includes a securement ring wih a first terminal end formed with outwardly projecting parallel rows of engagement teeth arranged to receive and engage a second terminal end including a latch. and

wherein said sack-shaped mantle is defined by an ellipsoidal surface of revolution including a major elongate vertical axis and a minor horizontal axis, and

wherein the major axis is of a length equal to 1.25 inches, and said minor axis is of a length equal to 1 inch, and

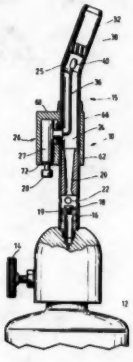
wherein the mantle is formed of stainless steel wire of a gauge within a range of twenty to thirty-five gauge.

4,881,894

SELF-IGNITING PORTABLE TORCH ASSEMBLY

David S. Chapin, Raleigh, N.C.; Gil Farnham, and Al Burgin, both of Sycamore, Ill., assignors to Cooper Industries, Inc., Houston, Tex.

Filed Feb. 16, 1988, Ser. No. 155,783
Int. Cl.[4] F23Q *7/12*
U.S. Cl. 431—255 10 Claims



1. A torch tip for connection to a source of pressurized flammable fluid comprising in operative combination:

mean for regulating the flow of the pressurized flammable fluid contained within the first portion of a tubular member;

means for drawing oxygen into the flow of the pressurized flammable fluid contained within a second portion of said tubular member;

a mixing chamber for combining the pressurized flammable fluid and oxygen contained within a third portion of said tubular member;

a flame holder located at one end of said mixing chamber;

means for producing an electrical potential mounted on the exterior of said tubular member downstream from said means for regulating the flow of the pressurized flammable fluid in a heat resistant housing;

a burn tube extending from said flame holder away from said mixing chamber;

means for producing a spark in said mixing chamber;

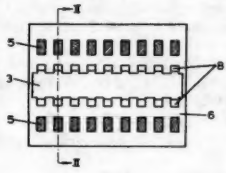
means for conducting electric current from said means for producing an electrical potential to said means for producing a spark, said means for conducting electrical current being contained entirely within said tubular member.

4,881,895

CERAMIC GAS BURNER FOR A COMBUSTION CHAMBER OF A HOT-BLAST STOVE

Jacob Felthuis, Alkmaar, and Ronald J. M. Stokman, Hillegom, both of Netherlands, assignors to Hoogovens Groep B.V., Ijmuiden, Netherlands

Filed Aug. 16, 1988, Ser. No. 232,670
Claims priority, application Netherlands, Aug. 31, 1987, 8702036
Int. Cl.[4] F24H *1/00*
U.S. Cl. 432—181 4 Claims



1. A ceramic gas burner for a combustion chamber of a hot-blast stove having parallel vertical supply ducts for the two combustion components, a first one of said ducts having an upwardly opening first outlet opening which has in plan view a substantially rectnagular shape with two long sides and the second of said ducts opening at a plurality of second outlet openings which are located on both sides of and above said first outlet opening, the general discharge directions of the second outlet openings being oblique to that of the first outlet opening, wherein as seen in plan view the first outlet opening has, in its long sides, a plurality of recesses which extend outwardly towards the second outlets said recesses being arranged so that, with respect to each said recess in a first one of said long sides of the first outlet opening, there is correspondingly a said recess directly opposite in the second of said long sides of the first outlet opening.

4,881,896

MUSCULAR EXPANSION BUMPER AND HEAD-GEAR APPLIANCE

Earl O. Bergersen, 950 Green Bay Rd., Winnetka, Ill. 60093

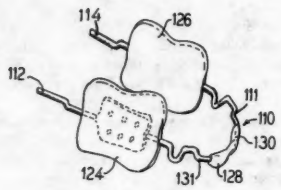
Continuation-in-part of Ser. No. 109,938, Oct. 19, 1987, Pat. No. 4,797,093. This application Oct. 11, 1988, Ser. No. 255,963
Int. Cl.[4] A61C *7/00*
U.S. Cl. 433—5 18 Claims

1. A muscular expansion bumper appliance for use in correcting human dentition comprising:

a wire form member having a generally U-shaped configura-

tion having a central bight portion with two free posterior ends;

at least one metallic plate member secured to said wire form member and extending vertically at least one of superior to or inferior to said wire form member;



said metallic plate member positioned on said wire form member between said free ends and said central bight portion; and

a plastic material covering said metallic plate member.

4,881,897

TOOTH-ROOT IMPLANT WITH LONG-TERM RESISTANCE TO REPETITIVE STRESSES

Henning Franck, Braunfels; Klaus-Konrad Deutscher, deceased, late of Wetzlar (by Anneliese Deutscher, executor); Heinz Broemer, Wetzlar; Volker Strunz, Berlin, and Wolfgang Rosenkranz, Schoeffengrund-Niederquembach, all of Fed. Rep. of Germany, assignors to Ernst Leitz Wetzlar GmbH, Wetzlar, Fed. Rep. of Germany

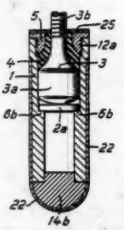
PCT No. PCT/DE87/00206, § 371 Date Jan. 7, 1988, § 102(e) Date Jan. 7, 1988, PCT Pub. No. WO87/06816, PCT Pub. Date Nov. 19, 1987

PCT Filed May 7, 1987, Ser. No. 154,349

Claims priority, application Fed. Rep. of Germany, May 9, 1986, 3615733

Int. Cl.[4] A61C *13/28*

U.S. Cl. 433—169 **32 Claims**



1. A tooth-root implant of high fatigue strength, comprising;

a sleeve having a coating of a bioactive material;

a pressure plate situated within said sleeve which serves as a damping diaphragm and on which rests a superstructure bearing surrounded, at least partially, by a plastic casing, and wherein a screw plug is provided with closes off an upper part of the sleeve in such a way that positive contact is made with the plastic casing; and

retention means for supporting said pressure plate, said pressure plate resting loosely on said retention means; wherein

said pressure plate and said superstructure bearing are composed of high fatigue-strength metal.

4,881,898

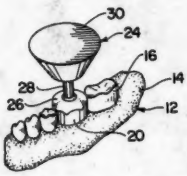
METHOD OF FORMING AN ANATOMICAL OCCLUSAL SURFACE CONFIGURATION ON A TOOTH-LIKE MEMBER AND STAMP FOR USE IN CONNECTION THEREWITH

Arthur E. Harvey, Sr., Davis Ave., Rd. #2, Pawcatuck, Conn. 06379; Thomas J. Harvey, 64 Floral Park Blvd., Pawtucket, R.I. 02861, and Donald H. Harvey, 233 Benham Rd., Apt. #4, Washington Bldg., Groton, Conn. 06340

Filed Apr. 14, 1988, Ser. No. 181,664

Int. Cl.[4] A61C *5/00*

U.S. Cl. 433—215 **9 Claims**



1. A method of forming an anatomical occlusal surface in a formable tooth-like member comprising the steps of:

(a) establishing a partially formed occlusal surface in said tooth-like member by meshing it with an opposing tooth, said partially formed occlusal surface including a biting surface but not including an anatomical surface pattern;

(b) separating said tooth-like member with said partially formed occlusal surface thereon from said opposing tooth; and

(c) pressing an anatomical surface configuration into said partially formed occlusal surface utilizing a rigid anatomical stamp having a predetermined complimentary anatomical occlusal surface configuration thereon, said stamp being formed without complimentary buckle, lingual, mesial and distal side surface portions and being pressed onto said tooth-like member so as to impart an anatomical surface configuration to said partially formed occlusal surface without significantly altering the configurations of the buckle, lingual, mesial and distal side surface portions of said tooth-like member.

4,881,899

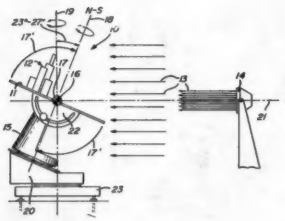
SUNSHINE SIMULATOR FOR SMALL SCALE MODELS

Jacques H. Derome, 168 du Béarn, St-Lambert, Quebec, Canada (J4S 1L1)

Filed Oct. 6, 1988, Ser. No. 254,148

Int. Cl.[4] G09B *9/00, 25/04*

U.S. Cl. 434—72 **23 Claims**



1. A sunshine simulator comprising model attaching support means pivotally attached to a support member for adjustable displacement on a transverse pivot axis relative to horizontal light rays emitted from a non-displaceable remote beam emit-

ting source whereby to position said support means at a position relative to said rays and corresponding to a desired earth latitude, said support member being pivotable secured to a base for axial rotation thereof on an inclined axis corresponding to the earth's inclination and with its axis of rotation intersecting said transverse pivot axis at an intersecting point whereby to position said support means at a position corresponding to a desired hour of the day, said base being rotationally secured to an inclined support wall pivotally secured to a stationary platform for rotation relative thereto on a rotation axis which is normal to said rays and which intersects at said intersecting point whereby to position said support means at a position corresponding to a desired seasonal position of the earth with respect to the sun, and dial means disposed between said support member and an adjacent circumferential portion of said inclined support wall to position said support means at a desired hour of day, said dial means being stationary relative to a light source position reference marking on said stationary platform.

4,881,900

SENSING DISPLAY APPARATUS OF IMAGE PATTERN

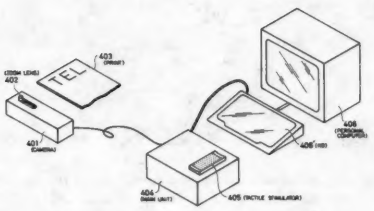
Mikiharu Matsuoka, Tokyo; Yasuhiro Yamada, Yokohama; Yasuko Miyazaki, Sagamihara; Takashi Kanemoto, Machida; Hirohiko Katayama, Kawasaki, and Tamao Ikuta, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 21, 1987, Ser. No. 76,180

Claims priority, application Japan, Jul. 23, 1986, 61-174052; Aug. 4, 1986, 61-183029; Aug. 4, 1986, 61-183077; Aug. 4, 1986, 61-183078; Nov. 20, 1986, 61-179619[U]

Int. Cl.[4] G09B *21/00*; G06K *9/00*

U.S. Cl. 434—113 **10 Claims**



1. A sensing display apparatus of an image pattern comprising:

converting means for converting an optical image recorded on a recording medium into an electric signal;

memory means for storing the electrical signal output from said converting means;

sensing display means for converting the electric signal output either from said converting means or from said memory means into a mechanical vibration and for displaying it in a tactile manner; and

selecting means, arranged near said converting means, for selecting between a first mode in which the electric signal converted by said converting means is directly output to said sensing display means, a second mode in which the electric signal converted by said converting means is stored in said memory means, and a third mode in which the electric signal stored in said memory means is output to said sensing display means.

4,881,901

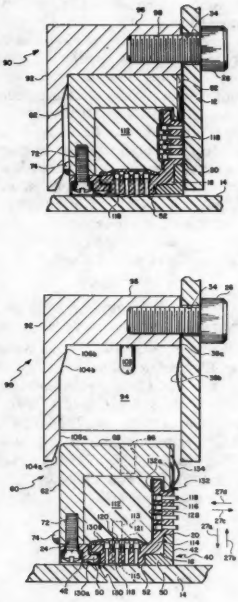
HIGH DENSITY BACKPLANE CONNECTOR

David W. Mendenhall, Greenville, R.I.; Steve P. Marian, Plainville, Mass.; Jay T. Goff, Cranston, R.I.; Neil J. Cotter, Marston Mills, Mass., and Steve R. Corbesero, Johnston, R.I., assignors to Augat Inc., Mansfield, Mass.

Filed Sep. 20, 1988, Ser. No. 246,777

Int. Cl.[4] H01R *9/09, 23/70*

U.S. Cl. 439—65 **10 Claims**



1. A high density backplane connector for mating and electrically interconnecting first and second high density circuit boards having predetermined geometric conductive patterns, comprising:

compliant contact module means for electrically interconnecting the first and second high density circuit boards, said compliant contact module means including

compliant means for providing a conductive matrix and biasing forces to electrically interconnect the first and second high density circuit boards,

first contact means coacting with said compliant means for electrically interconnecting said conductive matrix to the predetermined geometric conductive pattern of the first high density circuit board, and

second contact means coacting with said compliant means for electrically interconnecting said conductive matrix to the predetermined geometric conductive pattern of the second high density circuit board, said second contact means including biasing means for mechanically and electrically engaging the predetermined geometric conductive pattern of the second high density circuit board and for exerting a biasing force against the second high density circuit board for displacement thereof away from said compliant contact module means during initial mating;

stiffener module means secured to the second high density circuit board for providing a camming force sufficient to overcome said biasing force exerted by said biasing means wherein said second contact means is mechanically and

electrically engaged with the predetermined geometric conductive pattern of the second high density circuit board with a wiping action therebetween during mating; and

housing module means secured to the first high density circuit board for mounting said compliant contact module means therein and wherein said compliant means biases said first contact means into mechanical and electrical engagement with the predetermined geometric conductive pattern of the first high density circuit board, said housing module mean including camming means for coacting with said stiffener module means to provide said camming force during mating; and wherein

mating of the second high density circuit board to the first high density circuit board is effected by pressing said stiffener module means downwardly over said housing module means to sequentially cause said biasing means to engage the second high density circuit board, said stiffener module means cammingly coacts with said camming means of said housing module means to cause said second contact means to mechanically and electrically engage the predetermined geometric conductive pattern of the second high density circuit board, and said second contact means coacts with the predetermined geometric conductive pattern of the second high density circuit board to effect a wiping action therebetween.

4,881,902

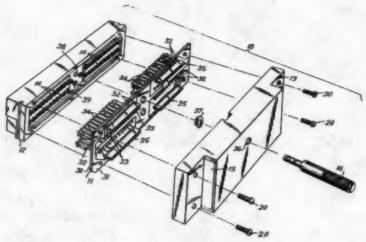
ELECTRICAL TERMINATOR DEVICE

Ralph A. Pape, Susquehanna Twp., Susquehanna County, and James R. Koser, Elizabethtown, both of Pa., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 914,551, Oct. 1, 1986, abandoned, which is a continuation of Ser. No. 727,918, Apr. 29, 1985, abandoned, which is a continuation-in-part of Ser. No. 653,381, Sep. 21, 1984, Pat. No. 4,585,284. This application Dec. 17, 1987, Ser. No. 135,532

Int. Cl.[4] H01R *13/66*

U.S. Cl. 439—76 **20 Claims**



1. An electrical device for terminating an input/output port in electronic equipment, said electrical device comprising:

a circuit board having first and second sides and a plurality of through holes, and having signal leads on at least one side in electrical contact with said plurality of through holes;

a plurality of electrical terminals, each of said terminals being a hermaphroditic serpent terminal having first and second contact ends, each of said terminals being mounted on said first side of said circuit board in a respective one of said plurality of through holes in electrical contact therewith at said first contact end, said terminals extending substantially perpendicularly from said circuit board and substantially parallel to one another;

a plurality of impedance elements mounted on said second side of said circuit board, each of said impedance elements being mounted in electrical contact with at least two of said plurality of through holes;

a first dielectric housing having multiple terminal receiving channels, said first housing presenting a mating face to said input/output port, said mating face being parallel to said circuit board, each of said serpent terminals being free of means for latching into said channels, said plurality of serpent terminals being simultaneously insertable into, and simultaneously removable from, said channels;

a second dielectric housing for covering said impedance elements on said second side of said circuit board; and

means for retaining said first dielectric housing, said circuit board, and said second dielectric housing in assembled, sandwiched relationship;

whereby said second ends of said terminals project from said terminal receiving channels in said first dielectric housing for connection to said input/output port, a selected impedance being observable between any two selected ones of said terminals for altering the relationship between said port and said electronic equipment.

4,881,903

TERMINAL CONNECTOR OF SMALL ELECTRIC DEVICES

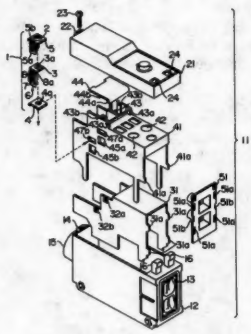
Yoshitaka Tsuji, Osaka, Japan, assignor to IDEC IZUMI Corporation, Osaka, Japan

Filed Aug. 25, 1988, Ser. No. 236,392

Claims priority, application Japan, Aug. 26, 1987, 62-129801[U]

Int. Cl.[4] H01R *9/24*

U.S. Cl. 439—76 **7 Claims**



1. A terminal connector of a small electric device, comprising:

a printed substrate having electric circuitry arranged thereon and formed with at least one terminal at a predetermined location for electrically connecting the electric circuitry to external devices;

a holding member adapted to accommodate the substrate therein and including terminal sections for providing locations for connecting electric wires from the external devices to each of the terminals; and

at least one terminal connecting device for fastening the electric wires, each said terminal connecting device being arranged in a respective said terminal section of the holding member and each including a fastening screw, a movable member for supporting the fastening screw, a terminal spring for movably and undetachably supporting the movable member, and a terminal fitting;

wherein the location of each said terminal formed on the substrate and the location of each said terminal connecting device are selected such that when the substrate is accommodated within the holding member and each said terminal connecting device is arranged in the holding member, a positional relation is attained whereby each said terminal on the substrate and a portion of each said terminal con-

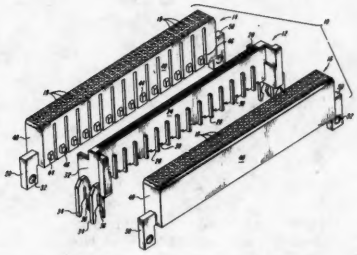
necting device are in contact and connected electrically with each other.

4,881,904

MODULAR ELECTRICAL CONNECTOR

J. Preston Ammon, Dallas, and Jerry Kendal, Lewisville, both of Tex., assignors to Augat Inc., Mansfield, Mass.

Filed Sep. 20, 1988, Ser. No. 246,874
Int. Cl.[4] H01R 9/09, 4/58
U.S. Cl. 439—78 **17 Claims**



1. A modular electrical connector for mounting a first and second plurality of electrical contacts in electrical connection with a printed circuit board, comprising:

a central module having a plurality of contact receptacles configured to receive the first plurality of electrical contacts;

a first contact module having a plurality of contact receptacles arranged in X rows, and wherein said plurality of contact receptacles are configured to receive electrical contacts of the second plurality;

a second contact module having a plurality of contact receptacles arranged in Y rows, and wherein said plurality of contact receptacles are configured to receive electrical contacts of the second plurality; and

means associated with said central module and said first and second contact modules for assembling said central module and said first and second modules in combination to form said modular electrical connector.

4,881,905

HIGH DENSITY CONTROLLED IMPEDANCE CONNECTOR

Henry W. Demler, Jr., Clearwater; Frank P. Dola, Hudson; David J. Kimmel, Clearwater; John H. Lauterbach, Hudson; Thomas J. Sotolongo, Clearwater Beach, and Grover A. Zwieg, Clearwater, all of Fla., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 866,518, May 23, 1986, abandoned.
This application Sep. 11, 1987, Ser. No. 96,792
Int. Cl.[4] H01R 23/70
U.S. Cl. 439—79 **4 Claims**

1. A multi-contact electrical connector assembly for interconnecting corresponding conductive traces on orthogonal printed circuit boards, comprising:

a first electrical connector having inner and outer terminals aligned in inner and outer rows respectively, the outer terminals being longer than the inner terminals;

inner and outer dielectric sleeves surrounding the inner and outer terminals, the inner and outer terminal ends extending beyond an upper face of the dielectric sleeves;

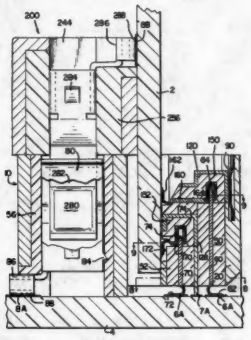
a first unitary housing formed of a conductive material surrounding and extending between the dielectric sleeves; the upper faces of the dielectric sleeves being exposed;

a second electrical connector having upper and lower terminals aligned in upper and lower rows respectively, each upper and lower terminal having a socket at one end thereof; the upper row being longer than the lower row;

upper and lower dielectric sleeves each one having a socket pocket in a lower face for receiving a corresponding one of said sockets;

a second unitary housing formed from a conductive material extending around the upper and lower dielectric sleeves; the lower faces of the dielectric sleeves being exposed;

the first and second connectors being mated with the inner and outer terminals extending at right angles to and being



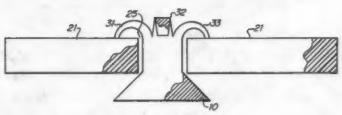
matable with the lower and upper terminals respectively, the sockets of the lower and upper terminals engaging ends of corresponding inner and outer terminals at the right angle intersections of the terminals; the lower faces of the upper and lower dielectric sleeves abutting the upper faces of the inner and outer dielectric sleeves, the first and second housings having interior and exterior walls individually surrounding each pair of mated terminals along substantially the entire length thereof with the dielectric sleeves forming an annular dielectric between the terminals and the housing walls.

4,881,906

METHOD FOR OBTAINING ELECTRICAL INTERCONNECT USING A SOLDERABLE MECHANICAL FASTENER

James C. Mackanic, Rocklin; Dawn M. Leiko, Citrus Heights; Steven A. Shugart, and James K. Koch, both of Rocklin, all of Calif., assignors to Helwett-Packard Company, Palo Alto, Calif.

Filed Feb. 25, 1988, Ser. No. 160,390
Int. Cl.[4] H01R 9/09
U.S. Cl. 439—83 **6 Claims**



1. A method forproviding an electrical connection between a bottom and a top of a printed circuit board, the method comprsing the steps of:

(a) isolating a first portion of conductive layer on top of the printed circuit board and around a hole in he printed circuit board, so that when soldering, heat may be conserved in the first portion;

(b) inserting an eyelet through the hole;

(c) crimping the eyelet so that tabs of the eyelet cause the eyelet to be mechanically retained in the hole, so that

capillary solder paths to the copper pad are formed, and so that the eyelet is crimped with such a tension that under its own weight the eyelet is able to non-resiliently move slightly in and out of the hole and the eyelet is able to move slightly in a horizontal motion across the first portion of the conductive layer;

(d) wave soldering the bottom of the printed circuit board.

4,881,907

CONDUCTOR STRIP FOR ELECTRICAL AND TELECOMMUNICATION CONDUCTORS

Nils-Åke Bergman, Juniviigen 24; Harald Widell, Kalendervägen 25, and Jan Widell, Augustiviigen 11, all of S-352 47 Växjö, Sweden

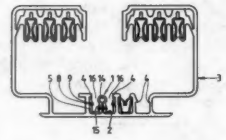
PCT No. PCT/SE86/00579, § 371 Date Jun. 23, 1988, § 102(e) Date Jun. 23, 1988, PCT Pub. No. WO87/03998, PCT Pub. Date Jul. 2, 1987

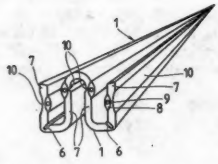
PCT Filed Dec. 18, 1986, Ser. No. 216,716

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1985, 8536122[U]

Int. Cl.[4] H01R *13/60*

U.S. Cl. 439—111 10 Claims





1. A conductor strip (1, 1', 1") for electrical and telecommunication connectors, with at least one electrical conductor (9, 12, 19) arranged along substantially the entire length of the strip for electrical contact to be made therewith at any selected position, and said conductor is arranged on the surface of an electrically non-conductive strip base (5), characterized in that the strip base (5) has free edges, is made of a flat resilient material and is provide with notches (6) which extend the length of the strip base and which allow the strip base (5) to be bent at approximately ninety degree angles into a desired shape, and the conductor strip (1, 1', 1"), because of the inherent resiliency of the strip base material, is automatically lockable by resilient expansion of the conductor strip when the free edges of the strip engage behind projections (4) of an installation channel (3).

4,881,908

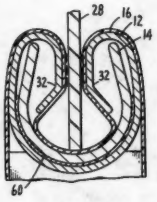
HIGH DENSITY AND HIGH SIGNAL INTEGRITY CONNECTOR

Michael Perry, Mountain View, and Gary Yasumura, Santa Clara, both of Calif., assignors to Beta Phase, Inc., Menlo Park, Calif.

Filed Oct. 11, 1988, Ser. No. 255,500

Int. Cl.[4] H01R *13/24*

U.S. Cl. 439—161 20 Claims



1. A high-performance connector comprising:

spring means, said spring means being an elongated hollow split tube having a longitudinal axis and an axially aligned split defining a generally C-shaped cross-section with end portions;

a heat-recoverable member, said heat-recoverable member being elongated and generally C-shaped and being concentrically positioned within the cross-section of said spring means and being biased by said spring means, said heat-recoverable member formed from shape-memory alloy having a deformable state below a transition temperature and a memory state above the transition temperature, said heat-recoverable member capable of being deformed by said spring means when said alloy is in its deformable state corresponding to one dimension of said split, a change from its deformable state to its memory state recovering said member to its non-deformed shape corresponding to another dimension of said split; and

first and second sets of parallel spaced conductors, each set terminating at one end of each set thereof in a first and a second matrix of contact pads, respectively, the contact pads of each matrix being spaced from each other in that matrix in two dimensions, said first and second sets of conductors at least partially surrounding said spring means and said matrices being positioned within the split of said spring means adjacent the end portions of said spring means, pads of the first matrix being positioned on one side of the split and the pads of the second matrix being positioned generally opposite thereto on the other side of the split, movement of said spring means causing the plurality of pads on each matrix to move toward each other to contact and electrically connect with a substrate that may be inserted within said split.

4,881,909

HOSE ASSEMBLY FOR CANISTER VACUUM CLEANER

Gordon R. Blackman, Lexington, Ky., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Oct. 31, 1988, Ser. No. 264,550

Int. Cl.[4] H01R *4/60*

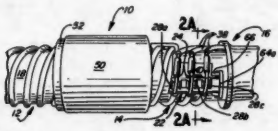
U.S. Cl. 439—191 28 Claims

1. An electrically conductive hose assembly for a vacuum cleaner, comprising:

a hose body having a plurality of resilient helical electrically conductive wires, said wires having end portions terminating along a line substantially axial with respect to said hose body;

a terminal assembly having a projecting hollow end portion received within said hose body, said hollow end portion having on its exterior a plurality of outwardly projecting

wire termination blocks for removably securing said wire end portions; and



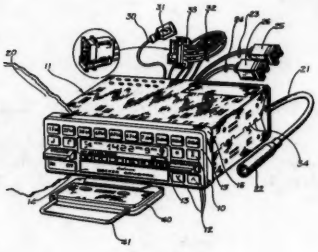
a removable sleeve disposed around the hose body receiving the terminal assembly end portion, said sleeve when so disposed preventing removal of the wire end portions from the termination blocks.

4,881,910

QUICK RELEASE MINIMUM PROFILE SHUTTLE FOR VEHICLE RADIOS AND TAPE PLAYERS

Walter Odemer, Burbank, Calif., assignor to Walter Odemer Co., Inc., Burbank, Calif.

Filed Sep. 21, 1987, Ser. No. 98,560
Int. Cl.[4] H01R *13/00*
U.S. Cl. 439—476 **4 Claims**



1. A shuttle for retention and release of vehicle radio and/or recording player unit including a recess for receiving a tape cassette and electrical connectors from a vehicle dash or console recess wherein the vehicles provides electrical connectors to the radio and/or recording player unit comprising:

a thin walled enclosure configured to generally match the exterior dimensions of the radio and/or cassette player of said unit and including an opening for receiving said unit;

electrical connectors located within said enclosure and configured and positioned to mate with the matching electrical connectors of said unit upon insertion of said unit into the enclosure;

means for securing said enclosure within the dashboard or console recess; and

a tape cassette shaped handle member for insertion into the tape cassette receiving recess of said unit and for mechanical engagement therewith upon insertion;

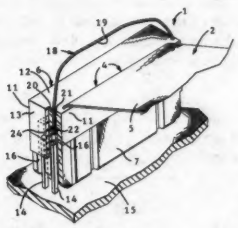
whereby said tape cassette-shaped handle member causes the removal of said unit by a pull on the handle member.

4,881,911

LANYARD FOR DISCONNECTING A CONNECTOR OF A CABLE ASSEMBLY

John T. Haddock, Lititz; Charles A. Miller, York New Salem; Stanford C. Moist, Jr., Hummelstown; Warren D. Nauman, Elizabethtown, and Ronald S. Pala, Mechanicsburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 21, 1989, Ser. No. 326,762
Int. Cl.[4] H01R *13/46*
U.S. Cl. 439—484 **15 Claims**



1. An electrical connector comprises, an insulative housing block, spaced apart cavities in the housing block and conductive electrical contacts in corresponding cavities for connection with corresponding conductors of electrical wiring, and for disconnect coupling with corresponding multiple electrical terminals arranged in an array, wherein the improvement comprises;

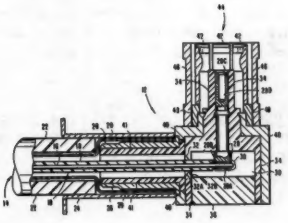
the housing block includes at least one recess without an electrical contact therein, said recess is open for pluggable receipt of a corresponding said electrical terminal, a flexible lanyard extends in a loop, said loop is anchored to said housing block, and said loop extends into said recess and is anchored therein.

4,881,912

HIGH VOLTAGE COAXIAL CONNECTOR

Robert L. Thommen, Indianapolis, and Eric B. Parker, Greenwood, both of Ind., assignors to Specialty Connector Company, Inc., Franklin, Ind.

Filed Apr. 29, 1988, Ser. No. 188,035
Int. Cl.[4] H01R *17/18*
U.S. Cl. 439—585 **8 Claims**



1. A coaxial cable connector comprising:

a conductive body having a hollow and a tubular portion communicating with the hollow interior, said body also having an access opening extending into the hollow interior;

insulation means completely lining the hollow interior of said conductive body, said insulation means having an opening therein coaxial with the tubular portion of said conductive body;

a coaxial mating connector attached to said conductive body

and including a shield contact connected to said conductive body, said coaxial mating connector also including a coaxial insulator which is an extension of said insulation means, said coaxial mating connector further including a conductor pin one end of which acts as a contact for said coaxial connector and the other end of which extends into said hollow interior, said pin being fixed within said coaxial insulator and insulation means;

an insulating piece for insertion into said access opening; and

clamping means for securing a coaxial cable to the tubular portion of said conductive body and electrically connecting the shield of the coaxial cable to said conductive body, such that the center conductor of the coaxial cable extends into said hollow interior in contact with said conductor pin,

whereby the contact between said conductor pin and the center conductor of the coaxial cable is accessible through said access opening before said insulating piece is inserted into said access opening.

4,881,913

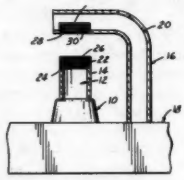
EXTENDED LIFE SPARK PLUG/IGNITER

Gamdur S. Mann, Grand Blanc, Mich., assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 207,586, Jun. 16, 1988. This application May 3, 1989, Ser. No. 346,968

Int. Cl.[4] H01I *13/20, 13/39*

U.S. Cl. 445—7 **8 Claims**



1. A process for forming an extended life spark plug having center and side electrodes comprising the steps of:

providing center and side electrodes of base metal alloy including chromium;

heating the center and side electrodes in air at a temperature in the range of 500° C.–600° C. for a time period to form a precursor oxide coating thereon; and

reheating the precursor oxide layer at a temperature in the range of 900°–1000° C. to provide a continuous, pore free, smooth adherent protective oxide layer on said center and side electrodes thicker than said precursor coating.

4,881,914

GETTER ARRANGEMENT HAVING A GETTER DETECTOR AND A POST-HEATING TIMER

Ronald P. T. Kamp, and Johannes P. De Meij, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 1, 1988, Ser. No. 278,884

Claims priority, application Netherlands, Dec. 16, 1987, 8703042

Int. Cl.[4] H01J *7/18*

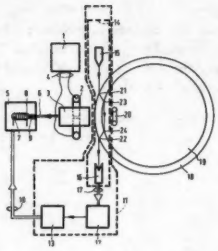
U.S. Cl. 445—73 **5 Claims**

1. A getter arrangement for providing a getter spot on a getter surface within an evacuated space by evaporating getter material arranged near the getter surface, the getter arrangement including heating means situated outside the evacuated space for within this space in the region of the getter material generating a heating power for evaporating the getter material, the getter arrangement further including a control unit for controlling the heating power, the control unit having detection means for detecting the presence of the getter spot on the getter surface, characterized in that:

the heating means are arranged for producing a substantially constant heating power,

the control unit further includes:

a timer connected to the detection means for measuring a first time interval from the beginning of the transfer of the heating power to detection of the getter spot;



a time interval generator connected to the timer for generating a second time interval which is contiguous to the first time interval and whose length is determined by the first time interval, the time interval generator producing a switch-off signal at the end of the second time interval;

the getter arrangement includes switching means for switching-off the supply of power to the getter material in response to the switch-off signal.

4,881,915

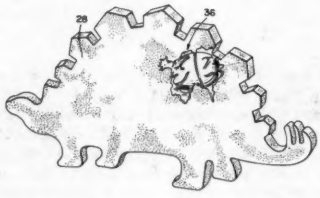
DINOSAUR EGG

J. Y. Liaw, Taipei, Taiwan, assignor to Li'l Mort Sales, Chicago, Ill.

Filed Apr. 4, 1988, Ser. No. 178,297

Int. Cl.[4] A63H *23/00, 33/00, 3/00, 3/36*

U.S. Cl. 446—153 **13 Claims**



1. A dinosaur egg toy comprising:

an eggshell defining a hollow cavity,

weakened fracture lines randomly oriented across an exterior surface of said eggshell,

a compressed sponge located within said cavity, and

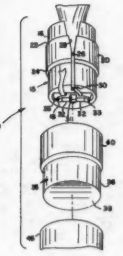
at least one opening formed in said eggshell to allow entry of water into said cavity for absorption by said sponge to cause said sponge to expand and rupture said eggshell at said fracture lines and emerge from said container at said fracture lines and at said at least one opening in an expanded condition.

4,881,916

DISPLAY BALLOON HOLDER

Dan B. Houser, Deerfield, Ill., assignor to RTC Industries, Inc., Chicago, Ill.

Filed Apr. 11, 1988, Ser. No. 180,181
Int. Cl.[4] A63H *3/06*
U.S. Cl. 446—222 6 Claims



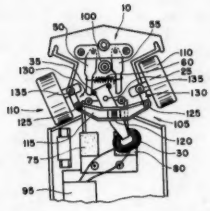
1. A display holder for an inflated balloon comprising: a two-member assembly, a first member including a tubular receptacle having a vertical wall and a bottom wall, and slot means for facilitating the entry of the balloon neck into said receptacle, constricting means on said first member comprising a cleat depending from said bottom wall for gripping and operationally retaining the neck of the balloon, and a second member being frictionally engageable with said first member for concealing said constricting means and the neck of the balloon operationally positioned thereon.

4,881,917

REMOTE CONTROL STEERING MECHANISM

Katsumi Suzuki, Tokyo, Japan, and Woo S. Yang, Seoul, Rep. of Korea, assignors to ITLA Corporation, Burbank, Calif.

Filed Dec. 30, 1987, Ser. No. 139,594
Int. Cl.[4] A63H *17/36, 30/04, 29/22, 33/26*
U.S. Cl. 446—468 9 Claims



1. A steering mechanism for a radio control device including:

a mobile frame having a pivot point;

an annular shaped coil positioned in a first plane;

first and second spaced apart permanent magnets being positioned in a second plane and being mounted on said mobile frame, said first permanent magnet having a pole facing said coil and said second permanent magnet having a pole, opposing said pole of said first permanent magnet, facing said coil;

holding means, pivotable about said pivot point, for holding said coil adjacent to said first and second permanent magnets;

energizing means, operatively connected to said coil, for providing a current to said coil so as to pivot said holding means about said pivot point; and

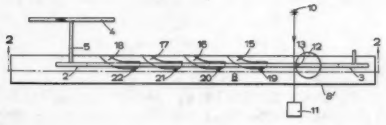
biasing means, for positioning said coil substantially equidistant from at least two of said opposing poles.

4,881,918

COIN AND DISC SORTING

David Goh, Shropshire; Anthony M. Moran-Iturralde, Nottingham, and Geoffrey Howells, Hampshire, all of England, assignors to Scan Coin AB, Malmo, Sweden

PCT No. PCT/GB87/00401, § 371 Date Mar. 21, 1988, § 102(e) Date Mar. 21, 1988, PCT Pub. No. WO87/07742, PCT Pub. Date Dec. 17, 1987
PCT Filed Jun. 10, 1987, Ser. No. 158,268
Claims priority, application United Kingdom, Jun. 12, 1986, 8614279; Jun. 12, 1986, 8614280
Int. Cl.[4] G07D *3/14*
U.S. Cl. 453—4 10 Claims



10. A coin sorter comprising a belt which is arranged in proximity to a support surface, means for feeding coins to said belt in single file, the arrangement being such that when said belt is driven the coins are trapped between said belt and said support surface and are carried along said support surface by the frictional engagement between said belt and the coins, a coin measuring means for measuring coins as they are conveyed by said belt along said support surface, a coin receiving means positioned alongside said support surface, the support surface being provided with at least one recess of a depth such that a coin when in the recess is still driven by the belt, the recess being bounded by a deflection wall which is shaped to deflect a coin which is engaged with said deflection wall out of the path of said belt to said coin receiving means, selectively operable positioning means positioned downstream of said coin measuring means and upstream of said recess for selectively displacing said coins transversely of the belt in response to said coin measuring means, whereby selected coins are positioned transversely of said belt such that they are pressed into said recess by said belt for deflection by said deflection wall.

4,881,919

BULK COIN HOPPER

Stanley P. Dabrowski, Euclid, Ohio, assignor to Ardac, Inc., Eastlake, Ohio

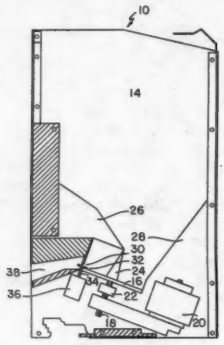
Filed Mar. 14, 1988, Ser. No. 167,406
Int. Cl.[4] G07D *1/00*
U.S. Cl. 453—57 10 Claims

5. A hopper for a changer, comprising:

a chamber for receiving coins in bulk, said chamber defined by a housing, said housing having a slot opening therein;

a first disk maintained at a bottom of said chamber and adapted for selective rotation, said first disk passing in juxtaposition to said slot opening in said housing; and

a second disk maintained at said slot opening and rotatable therein, said first and second disks being parallel to each



other and rotating in the same direction about parallel axes.

4,881,920

SELF-PROPELLING HARVESTER THRESHER

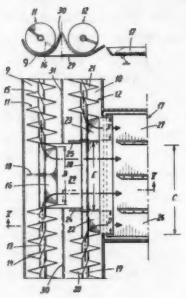
Franz Heidjann, Harsewinkel, Fed. Rep. of Germany, assignor to Claas OHG, Fed. Rep. of Germany

Filed Nov. 14, 1988, Ser. No. 271,092

Claims priority, application Fed. Rep. of Germany, Nov. 17, 1987, 3738991

Int. Cl.[4] A01F *7/04, 12/10, 12/46*

U.S. Cl. 460—66 **10 Claims**



1. A self-propelling harvester thresher, particularly a caterpillar-driven small harvester thresher for rice or the like, comprising a threshing and separating mechanism operating in accordance with an axial flow system and extending transversely to a travelling direction; a sieve device for separating a grain-chaff mixture and having a transporting bottom; and a transporting device arranged to transport the grain-chaff mixture from said threshing and separating mechanism to said sieve device, said transporting device including a trough and at least one collecting and transferring screw which is supported in said trough and extends transversely to the travelling direction, said collecting and transferring screw having two oppositely running screw plates provided on its ends and a throwing scoop provided in its center, said collecting and transferring screw and said trough being arranged before said transporting bottom as considered in a product throughgoing direction and substantially in a same horizontal plane with said transporting bottom.

4,881,921

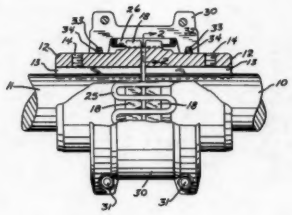
FLEXIBLE SHAFT COUPLING WITH COATED GRID

Glenn C. Pokrandt, Menomonee Falls; William F. Busser, Pewaukee; Donald N. Timmermann, Wauwatosa, and Thomas N. Kuliga, West Allis, all of Wis., assignors to The Falk Corporation, Milwaukee, Wis.

Filed Mar. 10, 1988, Ser. No. 166,432

Int. Cl.[4] F16D *3/52*

U.S. Cl. 464—54 **7 Claims**



1. In a flexible coupling having a pair of hubs each including a plurality of axially extending metal teeth whose adjacent side faces define slots therebetween, and a metallic grid joining the hubs and which includes a plurality of stiff metal rungs received in the slot and spanning the space between the hubs and integral end loops connecting adjacent rungs in an area axially displaced from the hub teeth, the improvement wherein:

the sides of the rungs in contact with the teeth have a layer of a deformable material which deforms relative to the teeth and the rungs as the coupling is subjected to torque loads, said layer having a thickness in excess of the largest anticipated manufacturing error in the circumferential spacing between the teeth or the rungs.

4,881,922

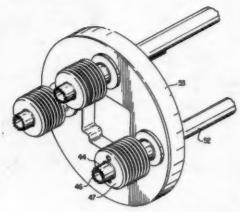
SEPARABLE DRIVE COUPLING USING METAL BELLOWS

Joe W. Ayers, Sherman, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 31, 1987, Ser. No. 91,188

Int. Cl.[4] F16D *3/52*

U.S. Cl. 464—79 **8 Claims**



1. A separable drive coupling, comprising:

a drive shaft terminating in a first coupling portion;

a driven shaft originating in a second coupling portion;

said first coupling portion having protruding teeth engagable with matching protruding teeth on said second coupling portion, in order that said drive shaft may provide rotation to said driven shaft; and

said driven shaft having flexible means for accommodating any axial or radial misalignment between said drive shaft and said driven shaft while allowing rotation of said shafts,

wherein said drive shaft operates under atmospheric conditions and said driven shaft operates in a vacuum.

4,881,923

TELESCOPIC TRANSMISSION JOINT, IN PARTICULAR FOR A VEHICLE

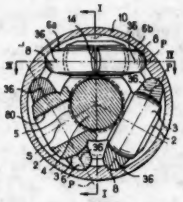
Michel Orain, Conflans Sainte Honorine, France, assignor to Glaenzer Spicer, Poissy, France

Filed Dec. 1, 1987, Ser. No. 127,504

Claims priority, application France, Dec. 5, 1986, 86 17044

Int. Cl.[4] F16D *3/20*

U.S. Cl. 464—111 **21 Claims**



1. A telescopic transmission joint, in particular for a vehicle, comprising a first element having an axis of rotation and provided with three arms disposed substantially radially relative to said axis, a second element having an axis of rotation and carrying longitudinally extending rolling tracks, two roller segments which partly surround each arm having radially outer surfaces in the shape of sections of a torus, are in rolling contact with the longitudinal rolling tracks of the second element, which tracks have a cross section whose direction of curvature is complementary to the direction of curvature of the radially outer surfaces of the roller segments, the radial arms including at least one spherical surface, the roller segments defining a spherical surface which are complementary to the spherical surface of the arm with which they are respectively associated, said spherical surfaces and said complementary spherical surfaces being centered at a distance from said axis of the first element.

4,881,924

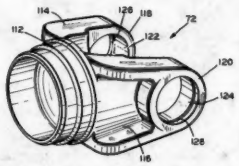
YOKE FOR HOOKES-TYPE UNIVERSAL JOINT

Ray A. Gall, Toledo, Ohio, assignor to Dana Corporation, Toledo, Ohio

Continuation-in-part of Ser. No. 129,765, Dec. 7, 1987, abandoned. This application Oct. 7, 1988, Ser. No. 255,710

Int. Cl.[4] F16D *3/40*

U.S. Cl. 464—134 **7 Claims**



1. A universal joint comprising:

a journal cross, said journal cross having;

a first pair of opposed, coaxial arms lying along a first axis;

a second pair of opposed, coaxial arms, said second pair of opposed, coaxial arms lying along a second axis which extends perpendicular through said first axis at an intersection;

said journal cross further having a central axis of rotation which extends perpendicularly to each of said first axis and said second axis and through said intersection; and

a ferrous metal yoke, said yoke conprising;

a hub having a central axis and an end; and

first and second arms extending from said end of said hub on opposite sides of said central axis of said yoke, said first and second arms being spaced apart from one another, said yoke being formed integrally in a single piece;

each of said first and second arms having an opening therein pivotably receiving one of said first pair of opposed arms of said journal cross;

said each of said first and second arms having a portion between said end of said hub and the opening in said each of said first and second arms which is C-shaped in cross-section, said portion having a generally planar web portion and first and second flanges extending generally perpendicularly outwardly from said generally planar web portion and generally parallel to each other, said each of said first and second arms having a shear center which lies along an axis that is positioned between said central axis of said yoke and said generally planar web portion of said portion of said each of said first and second arms;

said each of said first and second arms and said one of said first pair of opposed arms of said journal cross that is pivotably received therein having substantially corresponding free deflection characteristics under a torsional load applied around one of said central axis of said journal cross and said central axis of said hub of said yoke; and

rotatable means which is rotatable about a central axis that intersects said central axis of said yoke pivotably receiving each of said second pair of opposed, coaxial arms of said journal cross, whereby torque may be transmitted from one of said yoke and said rotatable means through said journal cross to the other of said yoke and said rotatable means.

4,881,925

BELT TYPE CONTINUOUSLY VARIABLE TRANSMISSION FOR VEHICLE

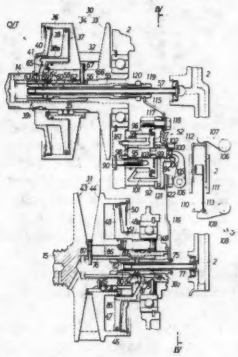
Torao Hattori, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 25, 1988, Ser. No. 185,512

Claims priority, application Japan, Apr. 24, 1987, 62-100105; Apr. 24, 1987, 62-100106; Apr. 24, 1987, 62-100107

Int. Cl.[4] F16H *11/02*

U.S. Cl. 474—18 **17 Claims**



1. A belt type continuously variable transmission comprising an input shaft driven from an engine, an output shaft for driv-

ing a wheel, a drive V-pulley mounted on said input shaft and variable in effective radius, a driven V-pulley mounted on said output shaft and variable in effective radius, a V-belt stretched around both said pulleys, a hydraulic actuator for changing the effective radius of each of said V-pulleys, a hydraulic pressure controller for controlling the hydraulic pressure supplied to said hydraulic actuator, said controller being provided between said hydraulic actuator and a hydraulic pump driven by the engine to supply a hydraulic pressure to said hydraulic actuator, an input torque sensor for controlling said hydraulic pressure controller in such a manner that the hydraulic pressure supplied to said hydraulic actuator is proportional to the input torque of said input shaft, a speed change ratio sensor for controlling said hydraulic pressure controller in such a manner that the hydraulic pressure supplied to said hydraulic actuator is proportional to the speed change ratio between said input and output shafts, said sensors being connected to said hydraulic pressure controller, wherein said hydraulic pressure controller comprises a regulator valve for permitting and interrupting communication of a working oil passage connecting said hydraulic pump and said hydraulic actuator with a spill oil passage, said regulator valve including a single valve spool and first and second pressure-control springs for biasing said valve spool in a closing direction, said input torque sensor being connected to said first pressure-control spring so as to apply thereto an urging load proportional to said input torque, and said speed change ratio sensor being connected to said second pressure-control spring so as to apply thereto an urging load proportional to said speed change ratio.

4,881,926

STEPLESS SPEED VARIATOR OF A BELT TYPE

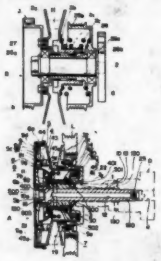
Hachiro Aoki; Tadashi Kobayashi; Junya Kuronuma, and Hideya Kikuchi, all of Saitama, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Nov. 29, 1988, Ser. No. 277,319

Claims priority, application Japan, Dec. 4, 1987, 62-184385[U]; Dec. 4, 1987, 62-184384[U]; Mar. 4, 1988, 63-28089[U]; Mar. 4, 1988, 63-28090[U]; Mar. 4, 1988, 63-28091[U]; Jun. 10, 1988, 63-141556

Int. Cl.[4] F16H *9/12*

U.S. Cl. 474—25 **16 Claims**



1. A stepless speed variator of a belt type including a drive pulley A provided on a drive shaft D of an engine and a driven pulley B for an auxiliary machine communicating with said drive pulley A through a V-belt and for continuously changing diameters of pitch circles of both pulleys, comprising;

said driven pulley B providing a fixed pulley 2*a* having an auxiliary machine drive pulley b and a movable pulley 2*b* to be pulled to said fixed pulley side by a spring 2*c*,

said drive pulley A providing,

I. a rigid pulley 2 secured on said drive shaft D,

II. a mount bolt 10 coaxially connected to the drive shaft D,

III. a guide holder 5 fitted to said mount bolt 10 and having a cylindrical shaft 5*a* to be rotated together with said mount bolt and a flange 5*c* formed on the end of said shaft 5*a*,

IV. a slide pulley 4 to be axially moved by the flange 5*c* guiding the outer peripheral side and the rigid pulley 3 guiding the inner peripheral side thereof and to be rotated together with the rigid pulley 3 by a motion transmission means 9,

V. a centrifugal force offset cover 56 located at the back of said guide holder flange 5*c* and to be moved together with said slide pulley 4,

VI. said slide pulley being combined with a tube power piston 4*a* to be moved along said guide holder shaft 5*a*, said power piston 4*a* and slide pulley 4 being constantly pulled toward said rigid pulley 3 by a power spring 20, thereby forming a variable power piston chamber 5*f* defined by said power piston 4*a*, said slide pulley 4, and said guide holder flange 5*c*,

VII. a supply passage 12 within the mount bolt 10 for an engine oil supplied through said drive shaft D and an ejection passage 13 provided on the outer periphery of the mount bolt for returning the engine oil from said power piston chamber 5*f* to said drive shaft D,

VIII. said power piston 4*a* providing a cylindrical servo valve 7 for controlling conduction of the engine oil in or out of said power piston chamber 5*f*, said servo valve 7 being fitted to the outer periphery of said power piston 4*a* in such a manner as being relatively moved in the axial direction and being constantly pulled toward the rigid pulley by a governor spring 24, while said servo valve 7 being moved as opposed to said governor spring 24 depending on the displacement of a flyweight located in said power piston chamber 5*f* with the rotation of said drive shaft D,

IX. said centrifugal force offset cover 6 communicating with said engine oil ejection passage 13 in the interior thereof in such a manner as, when said slide pulley 4 is moved, conducting the engine oil through said engine oil ejection passage 13 and preventing shutting of said slide pulley 4 by the rotation oil pressure.

4,881,927

FLUIDIC TENSIONER

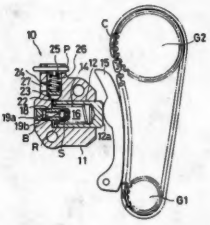
Tadasu Suzuki, Kawagoe, Japan, assignor to Tsubakimoto Chain Company, Japan

Division of Ser. No. 172,314, Mar. 23, 1988. This application May 19, 1989, Ser. No. 354,464

Claims priority, application Japan, Aug. 6, 1987, 62-119784; Oct. 9, 1987, 62-154131

Int. Cl.[4] F16H *7/08*

U.S. Cl. 474—110 **10 Claims**



1. A hydraulic ball-type check valve tensioner including a plunger internally provided with a first fluid chamber and slidably fitted in a housing in association with a first spring biasing said plunger in a protruding direction, a ball-type check valve provided between said housing and said first chamber to permit fluid flow into said first chamber while blocking fluid flow in the reverse direction, characterized in that said tensioner comprises:

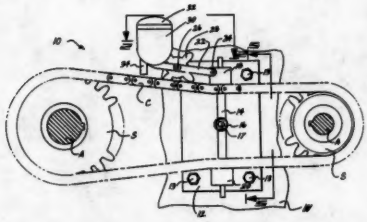
a relief valve having a sleeve slidably fitted in an auxiliary fluid chamber in communication with said first chamber, a second spring biasing said sleeve into a depressed position,

and a discharge port to be opened when said sleeve is slided against the biasing action of said second spring.

4,881,928
CHAIN TENSIONING DEVICE

Medardo P. Bernal, 655 Donna Beth Ave., #23, Azusa, Calif. 91702

Filed Oct. 7, 1988, Ser. No. 254,929
Int. Cl.[4] F16H *7/08*
U.S. Cl. 474—111 **6 Claims**

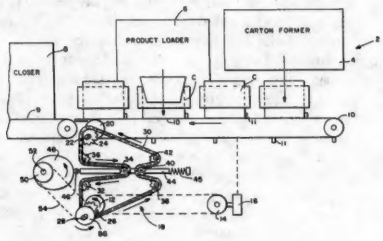


1. A chain tensioning device, comprising:
a pair of spaced blocks;
said blocks having opposed surfaces configured for abutment with opposite sides of an endless loop chain;
aligned apertures formed through each of said blocks;
an elongated connecting bar extending between said blocks and through said aligned apertures;
means for independently adjustably securing each of said blocks along the length of said connecting bar;
a mounting standard perpendicularly attached at a central portion of said connecting bar;
a base connected to said mounting standard;
means for securing said base adjacent a chain to be tensioned.
a support link secured to one of said blocks;
a gear rotatably mounted on said link;
an oil reservoir on said link;
an output nozzle on said reservoir; and
valve means actuated upon rotation of said gear for opening and closing said output nozzle to lubricate a chain.

4,881,929
STOP AND GO CONVEYOR

Arthur E. Randles, 4617 S. Third Ave., Tucson, Ariz. 85714

Filed May 15, 1989, Ser. No. 352,156
Int. Cl.[4] F16H *7/08*
U.S. Cl. 474—111 **5 Claims**

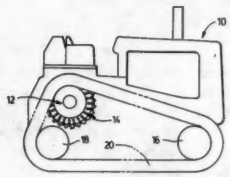


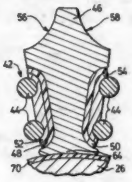
1. A stop and go conveyor comprising:
a driver sprocket;
rotary input means rotating said driver sprocket at a constant speed;
a driven sprocket;
a chain positively engaged over said driver and driven sprockets with slack therebetween;
a pair of movable idler sprockets positively engaging said chain between said driver and driven sprockets to take up said slack;
a reciprocable carrier rotatably supporting said movable idler sprockets; and
means for reciprocating said carrier through a complete cycle during each revolution of said driver sprocket so that, in one direction, more chain is received at the reciprocating idler sprocket from said driven sprocket than is taken from said driver sprocket and, in the other direction, more chain is taken from said driver sprocket at the reciprocating idler sprocket than is received from said driven sprocket.

4,881,930
SPROCKET ASSEMBLY

Thomas E. Oertley, Dunlap, Ill., assignor to Caterpillar Inc., Peoria, Ill.

Filed Feb. 23, 1989, Ser. No. 314,679
Int. Cl.[4] F16H *55/12*
U.S. Cl. 474—162 **16 Claims**





1. A resilient drive sprocket assembly, comprising:
a housing having a mounting portion, a circular hub portion, and first and second circular flanges, said first flange being spaced from and substantially parallel to said second flange, said first and second flanges defining a space therebetween, said first flange having first and second arrays of equally spaced through holes, said second flange having third and fourth arrays of equally spaced through holes, each one of said first array of holes being in substantially axial alignment with one of said third array of holes, and each one of said second array of holes being in substantial axial alignment with one of said fourth array of holes;
a plurality of individually replaceable drive members, each member having first and second retaining portions and first and second driving portions, said drive members being positioned within said space between said first and second flanges and equally spaced around said hub portion;
a plurality of resilient pads, a respective pad being adapted to fit against the first and second retaining portion of each drive member;
a plurality of retaining members, one retaining member being adapted to fit against each resilient pad; and

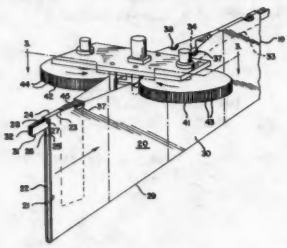
a plurality of retaining pins, each pin being adapted to penetrate one of said holes in said first flange and a corresponding aligned hole in said second flange.

4,881,931

HEM SEAL FOR DRAW TAPE BAGS

James E. Buchman, Appleton, Wis., assignor to Presto Products, Incorporated, Appleton, Wis.

Filed Apr. 10, 1987, Ser. No. 36,896
Int. Cl.[4] B31B *1/64*
U.S. Cl. 493—192 7 Claims



1. Apparatus used in the manufacture of draw tape plastic bags formed from a web of plastic material having a hem defining a channel for the draw tape comprising:

conveyor means for continuously moving said web, having a front sheet and a rear sheet, in C-folded condition;

first and second seal wheels disposed along said conveyor on opposite sides of said web;

heat application means, disposed along said first and second seal wheels between said front sheet and said rear sheet, having a first contoured surface facing said first seal wheel and a second contoured surface facing said second seal wheel; said heat application means defining a first plurality of outlets for directing hot air from said first contoured surface toward said first seal wheel and a second plurality of outlets for directing hot air from said second contoured surface toward said second seal wheel; and

guide means, disposed adjacent said web, for guiding a first hem portion between said first seal wheel and said first contoured surface, and for guiding a second hem portion between said second seal wheel and said second contoured surface, said first seal wheel urging said front sheet into contact with said first hem portion, and said second seal wheel urging said rear sheet into contact with said second hem portion.

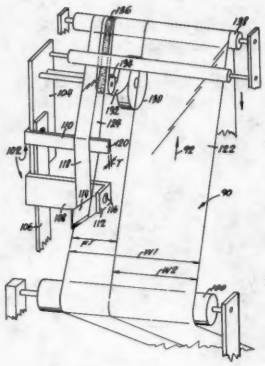
4,881,932

METHOD AND APPARATUS FOR MANUFACTURING PLASTIC FILM BAG WITH SPECIAL FLAP ARRANGEMENT

Eli Biatt, 6 Rolling Dr., Brookville, N.Y. 11545

Filed Mar. 1, 1988, Ser. No. 163,288
Int. Cl.[4] B31B *1/90, 23/14*
U.S. Cl. 493—213 11 Claims

1. In a method of forming a bag from plastic film comprising forming a mouth and a flap to close said mouth, the improvement comprising separating the flap into separate sections spaced by a gap therebetween by continuously slitting the flap into said separate sections and controlling the size of the gap by interposing a spacer between said sections thereby displacing the sections from coplanar relationship, bring the sections into copolanar relationship, and connecting the sections with an



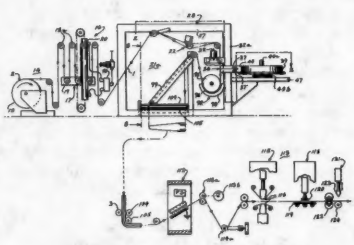
adhesive bearing tape with the adhesive being exposed through the gap to adhere to said bag when the flap is folded over.

4,881,933

DRAW TAPE BAG FORMING METHOD AND APPARATUS

Robert J. Wech, Green Bay, Wis., assignor to Amplas, Inc., Green Bay, Wis.

Filed Feb. 22, 1988, Ser. No. 158,418
Int. Cl.[4] B31B *1/90*
U.S. Cl. 493—225 27 Claims



1. A compact draw tape bag forming apparatus for forming bag members from a single integral plastic sheet folded along a longitudinal line to define two adjoining bag side walls which are joined along longitudinally spaced portions to define an open-top bag and wherein each of the free edges of said bag are folded inwardly to form a sealed hem with a draw tape therein, the improvement in the forming apparatus comprising,

a hem forming unit forming a double wall open hem in each edge of said web and of a depth corresponding to said hems, a tape inserting unit located downstream of said hem forming unit for inserting individual tapes into said hems, a heat sealing unit located downstream of said inserting unit and having means to simultaneously and continuously seal the inwardly folded web onto the web to form hems with said tapes therein, a web folding unit board means located downstream of said heat sealing means for folding said web along a center line of the web,

means supporting said hem forming unit, said tape inserting unit, said heating sealing unit and said folding units in a generally encircling vertical path, wherein said hem folding unit is secured to the top of said path, said web moving

from a first vertical side upwardly and horizontally from a web source to said hem forming unit, a notching unit for forming notches in each of said hems, said notching unit and said tape inserting unit located to the discharge side of said hem folding unit and in a vertical portion of said path, means for turning of said web from said hem forming unit into said notching unit, said tape inserting unit having means for inserting individual tapes into said open hems, said heat sealing unit located beneath said inserting unit, said web folding unit located generally in alignment beneath said hem folding unit, and means turning said web from said heat sealing unit into said web folding unit.

4,881,934

ROTARY TRANSFER MECHANISM

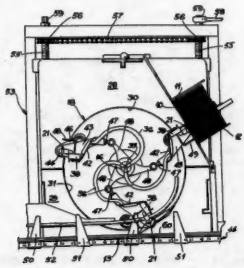
John C. Harston, Avon, and Colin P. Ford, Bristol, both of England, assignors to Kliklok Corporation, Decatur, Ga.

Filed Feb. 27, 1989, Ser. No. 316,505

Claims priority, application United Kingdom, Feb. 27, 1988, 8804637

Int. Cl.[4] B65H *3/08*; B31B *1/80*

U.S. Cl. 493—315 **11 Claims**



1. A rotary transfer mechanism for transferring a flat article from a discharge opening of a magazine to a receiving station on a conveyor, comprising:

a support member;

a drive shaft rotatably mounted on said support member;

means for rotatably driving said drive shaft;

carrier means rotatable with said drive shaft;

at least one support shaft rotatable on said carrier means substantially parallel to said drive shaft whereby said support shaft orbits around said drive shaft;

vacuum means including a suction means connected to said support shaft for (1) positively engaging the article at the discharge opening of the magazine, (2) positively holding the article during transfer to the receiving station, and (3) releasing said article at said receiving station; and

means for controlling the rotational disposition of the support shaft with respect to said carrier means, said controlling means including a pinion secured coaxially to the support shaft, an arcuate rack secured to the support member, a cam follower on an arm extending laterally from the support shaft and a cam track secured to the support member;

said arcuate rack being in such a position so as to act upon the pinion to create a partial path of the suction means with a node point at the discharge opening of the magazine and said cam track being of such an extent as to act upon the cam follower when the arcuate rack is not acting on the pinion with the profile of the cam track being such as to cause the suction means to move past the receiving station in the same direction as the conveyor with the article generally parallel to the conveyor.

4,881,935

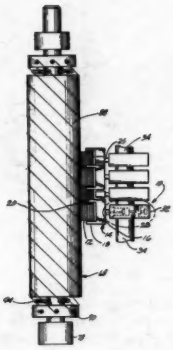
METHOD FOR CONSTANT PRESSURE DIAGONAL-WEB CRUSH-SCORING

Yefim Slobodkin, Lyndhurst, Ohio, assignor to Avery International Corporation, Pasadena, Calif.

Continuation of Ser. No. 096,904, Sep. 14, 1987, abandoned, which is a continuation of Ser. No. 804,817, Dec. 4, 1985, Pat. No. 4,698,052. This application Aug. 18, 1988, Ser. No. 233,945

Int. Cl.[4] B05B *1/14*

U.S. Cl. 493—355 **6 Claims**



1. A method for crush-scoring a web of paper comprising the steps of:

(a) passing one side of a web of paper to be crush-scored in contact with the outer side surface of a crush-scoring cylinder having diagonal crush-scoring protrusions extending from the surface thereof and rotating in the direction of the paper travel;

(b) contacting the side of the web of paper opposite the side of the web of paper which is in contact with the crush-scoring cylinder with a plurality of cylindrical anvil roller rotating in the direction of paper travel, each cylindrical anvil roller being mounted to enable essentially frictionless movement to or from the point of contact with the web of paper and positioned to essentially contact no more than one protrusion at any time; and

(c) unidirectionally applying a preselected force to each cylindrical anvil roller against the web of paper, to form in cooperation with the protrusions diagonal crushscores of substantially constant depth.

4,881,936

APPARATUS FOR CONSTANT PRESSURE DIAGONAL WEB CRUSH-SCORING

Yefim Slobodkin, Lyndhurst, Ohio, assignor to Avery International Corporation, Pasadena, Calif.

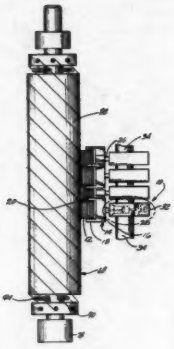
Continuation of Ser. No. 96,903, Sep. 14, 1987, abandoned, which is a continuation of Ser. No. 804,817, Dec. 4, 1985, Pat. No. 4,698,052. This application Aug. 18, 1988, Ser. No. 233,946

Int. Cl.[4] B05B *1/14*

U.S. Cl. 493—355 **7 Claims**

1. In an apparatus for crush-scoring a web of paper, which apparatus comprises a rotatable crush-scoring cylinder having an axis and providing one or more protrusions extending from the surface thereof and across the crush-scoring cylinder at an angle diagonal to the axis of the crush-scoring cylinder, and means to apply a force to a web of paper passed between said means and the crush-scoring cylinder to diagonally crush score the web of paper, the improvement which comprises employing, as the means to apply a crush score force to the web of paper, a plurality of rotatable cylindrical anvil roller assemblies adjacently positioned across the width of said crush-scoring

cylinder, each anvil roller independently adapted to apply a preselected constant crush-scoring force against a web of paper passing over a protrusion extending from the surface of the crush-scoring cylinder and to essentially contact no more than one protrusion at any time, the crush-scoring cylinder,



through rotation and cooperation of rotating anvil rollers and the protrusions, causing a substantially constant force to be applied to the web of paper across the width of the crush-scoring cylinder such that each diagonal crush score formed will be of substantially constant depth.

4,881,937

METHOD OF TREATING A PART OF THE BODY WITH RADIOACTIVE MATERIAL AND A TROLLEY FOR USE THEREIN

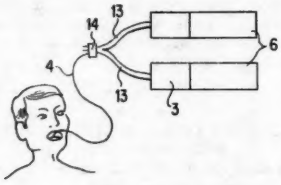
Eric van't Hooft, Gezichtslaan 16, 3956 BB Leersum, and Libbe van Zwol, Leersum, both of Netherlands, assignors to Eric van't Hooft, Netherlands

Filed Jul. 10, 1987, Ser. No. 71,835

Claims priority, application Netherlands, Jul. 10, 1986, 8601808

Int. Cl.[4] A61M *37/04*; A61N *5/10*; G21F *5/20*

U.S. Cl. 600—3 **19 Claims**



1. In an apparatus for effecting radioactive therapy in an animal body wherein the apparatus has a radioactive source assembly disposed in a source channel, a guide tube connected at a first end to said source channel and a second end being disposable in the animal body for the intended therapy, a source assembly transport thread connected to the source assembly and to a source assembly drive means for driving the source assembly from the source channel and towards the said second end of the guide tube,

the improvement comprising a test assembly disposed in a test channel, a connector tube connected at a first end to said test channel and at a second end to a connector disposed in said guide tube, wherein a juncture is formed at said connector between said guide tube and said connector tube, a test assembly transport thread attached at one end to said test assembly and at the other end to a test assembly drive means for driving the test assembly from the test channel, through the connector tube and connector, and towards said second end of the said guide tube, whereby the source assembly and the test assembly are alternatingly drivable toward the second end of the guide tube, and a detector means for detecting the presence of the test assembly, or the source assembly in the guide tube between the juncture and the second end of the guide tube.

4,881,938

METHOD AND AN APPARATUS FOR TREATING A PART OF THE BODY WITH RADIOACTIVE MATERIAL

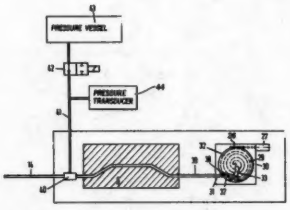
Eric van't Hooft, Gezichtslaan 16, 3956 BB Leersum, Netherlands

Continuation of Ser. No. 689,781, Jan. 8, 1985, abandoned. This application Feb. 18, 1987, Ser. No. 17,036

Claims priority, application Netherlands, Jan. 12, 1984, 8400108

Int. Cl.[4] A61N *5/10*; A61M *37/04*; G21F *5/02*

U.S. Cl. 600—3 **15 Claims**



1. An apparatus for delivering at least one assembly of radioactive source material to a site in a human body for radioactive therapy, comprising:

(1) an applicator having a first end and an opposite end, said first end being at least in part disposable inside the human body at the site intended for therapy and capable of receiving an assembly of radioactive source material, and said opposite end being disposable outside of the human body;

(2) an applicator connector having a first end, a second end and a passageway extending therebetween and capable of passing a said assembly therethrough, said applicator connector being affixed at the first end thereof to the said opposite end of the applicator;

(3) a container for storing at least one said assembly and having at least one container passageway therethrough;

(4) a transfer tube means disposed between said container and said applicator connector with one end thereof connected to said second end of the applicator connector;

(5) coupling means for coupling the other end of the transfer tube means to said container passageway;

(6) transfer thread means attached at one end to an assembly of radioactive source material for transferring said assembly from the container to said applicator;

(7) drive means connected to the other end of the transfer thread means for driving said transfer thread means;

(8) control head means attached to said assembly that is capable of being sensed by a sensing means, and sensing means for sensing when the control head means is positioned such that said attached assembly is positioned in said applicator;

(9) control means responsive to said sensing means such that when the assembly is in said position in said applicator, said control means interrupts said drive means, and further driving of said transfer thread cases.

4,881,939

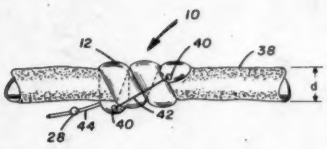
IMPLANTABLE HELICAL CUFF

Arnold L. Newman, Kensington, Md., assignor to The Johns Hopkins University, Baltimore, Md.

Filed Feb. 19, 1985, Ser. No. 702,570
Int. Cl.[4] A61B *17/12*
U.S. Cl. 600—31 38 Claims

1. An implantable inflatable cuff which intimately engages the exterior of an elongated body member, the implantable inflatable cuff comprising:

a coil which follows a spiral axis and turns about a central axis, said coil having a cross sectional shape that remains constant throughout its length, an elastic inside wall facing said central axis, a lumen within said coil and eccentric to said spiral axis and a fluid contained within said lumen; and



a retaining means which is removably positioned about and extends across a plurality of turns of said coil for maintaining said coil in said spiral axis.

4,881,940

GRANULATED MAGNESIUM MONOPEROXYPHTHALATE COATED WITH FATTY ACID FOR PREVENTION OF DYE DAMAGE OF BLEACH SENSITIVE FABRICS

Jean Massaux, Olne; Pierre Lambert, Cortil-Wodon, and Jacques Noiret, Vivegnis, all of Belgium, assignors to Colgate-Palmolive Co., Piscataway, N.J.

Continuation of Ser. No. 67,053, Jun. 25, 1987, abandoned. This application Jul. 25, 1988, Ser. No. 227,440

Int. Cl.[4] D06L *3/02, 3/04*

U.S. Cl. 8—111 17 Claims

1. A bleaching agent particularly effective for low temperature bleaching of laundry while substantially avoiding concomitant dye damage of bleach-sensitive dyed fabrics comprising: particles of monoperoxyphthalic acid, said particles being at least partially coated with an effective amount of a substantially aliphatic fatty acid mixture comprised of at least about 16% and no more than about 40%, by weight, of fatty acids having a chain length of from 20 to 22 carbon atoms, said mixture being substantially free of fatty acids having less than 14 carbon atoms.

4,881,941

SUPPRESS DYEING METHOD

Michael W. Dixon, Dallas, N.C., assignor to Sandoz Ltd., Basel, Switzerland

Filed Jul. 12, 1988, Ser. No. 217,800

Int. Cl.[4] D06P *5/00;* C09B *67/00*

U.S. Cl. 8—482 18 Claims

1. A method of coloring a textile substrate which comprises applying a dye from an oil medium to part but not all of the surface of the substrate by immersing the substrate in a gathered configuration into the oil medium containing a dye dissolved or dispersed therein for a time sufficient so that the dye-containing oil comes into contact with only part of the surface of the substrate, said dye being one which is capable of imparting a desired color to the substrate and said oil being of sufficient viscosity that it does not readily wick into the fibers of the textile substrate in those areas where it has not been applied.

4,881,942

COLORATION PROCESS FOR CELLULOSE POLYESTER TEXTILE BLENDS WITH A REACTIVE DYE CONTAINER A QUATERNARY NITROGEN SUBSTITUENT (E.G. NICOTINIC ACID) AND A DISPERSE DYE

Herbert G. Connor, Lancashire, England, assignor to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 84,854, Aug. 13, 1987, abandoned. This application Jul. 7, 1988, Ser. No. 217,122

Claims priority, application United Kingdom, Sep. 10, 1986, 8621795

Int. Cl.[4] C09B *62/04;* D06P *1/38, 3/87*

U.S. Cl. 8—532 11 Claims

1. A process for the coloration of a union of polyester and cellulose textile materials which comprises applying thereto a dye liquor or print paste containing a disperse dye and a dye containing a cellulose reactive group having a quaternary nitrogen substituent, or the precursors of such a dye, and thereafter heating the textile material at a temperature in the range from 160° to 250° C. to fix the dye on the textile material, the pH of the liquor or paste being in the range from 5.8 to 8.0 due to the presence of an alkaline agent therein.

4,881,943

DISPERSE DYES: NITRO-THIOPHENE AZO DYES FOR BRIGHT BLUE SHADES ON POLYESTER

David Brierley, Lancs; Ronald W. Kenyon, Manchester, and Denis R. A. Ridyard, Hazel Grove, all of England, assignors to Imperial Chemical Industries PLC, London, England

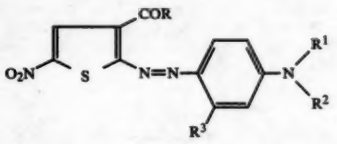
Filed Jun. 28, 1988, Ser. No. 212,679

Claims priority, application United Kingdom, Jun. 29, 1987, 8715192; Feb. 23, 1988, 8804172

Int. Cl.[4] C09B *29/03;* D06P *1/18, 3/54*

U.S. Cl. 8—662 11 Claims

1. A disperse monoazo dye of the formula:



wherein each of R and R^3 represents a lower alkyl radical, R^1 represents a lower alkyl or C_3–C_6 alkenyl radical and R^2 represents a C_2–C_6 alkyl radical carrying a hydroxy or acyloxy substituent.

4,881,944

METHOD OF MAKING POSITIVE BATTERY PASTE

Richard H. Hammar, Utica, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 3, 1989, Ser. No. 318,396

Int. Cl.[4] H01M *4/20*

U.S. Cl. 29—623.5 3 Claims

1. In the method of making positive electrode for a lead-acid storage battery comprising the principal steps of reacting an active material mixture of PbO and Pb with H_2SO_4 to form $PbSO_4$ throughout the mixture, applying the mixture to a conductive support and electrochemically forming the mixture to convert the active material into a microporous mass comprising principally PbO_2, the improvement comprising distributing a plurality of polyacetal resin particles substantially uniformly throughout said mixture prior to said applying and subsequently destroying said particles without a trace while electrochemically forming said active material so as to leave in their place a plurality of macropores distributed throughout the active material, said macropores being thousands of times larger than the micropores of said mass and sufficient to provide significant increased electrolyte-storage volume within the active material to improve the reserve capacity of the battery.

4,881,945

FUEL COMPOSITIONS CONTAINING VERY LONG CHAIN ALKYLPHENYL POLY(OXYALKYLENE) AMINOCARBONATES

Thomas F. Buckley, III, Hercules, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Oct. 23, 1987, Ser. No. 112,901

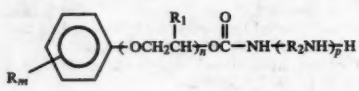
Int. Cl.[4] C10L *1/22*

U.S. Cl. 44—72 40 Claims

1. A fuel composition comprising a hydrocarbon boiling in the gasoline or diesel range and from about 30 to about 5,000 parts per million of a fuel soluble alkylphenyl poly(oxyalkylene) aminocarbamate having at least one basic nitrogen and an average molecular weight of about 800 to 6,000 and wherein the alkyl group of ssid alkylphenyl poly(oxyalkylene) aminocarbamate contains at least 40 carbon atoms and the poly(oxyalkylene) polymer is derived from C_2 to C_5 oxyalkylene units with the proviso that if the poly(oxyalkylene) polymer is a homopolymer of oxyethylene then the poly(oxyethylene) polymer does not contain more than 25 oxyethylene units.

13. A fuel composition comprising a hydrocarbon boiling in

the gasoline or diesel range and from about 30 to about 5,000 parts per million of a fuel soluble compound of Formula V



V

wherein R is an alkyl group of at least 40 carbon atoms; R_1 is hydrogen or alkyl of from 1 to 3 carbon atoms; R_2 is alkylene of from 2 to 6 carbon atoms; m is an integer from 1 to 2; n is an integer such that the molecular weight of the compound is from about 800 to 6,000; and p is an integer from 1 to 6 and with the proviso that if R_1 is hydrogen then n is an integer of from 1 to 25.

4,881,946

PROCESS FOR THE BENEFICIATION OF COAL BY SELECTIVE CAKING

Antonio Vettor, San Donato Milanese; Nello Passarini, Colturano, and Armando Marcotullio, San Donato Milanese, all of Italy, assignors to Eniricerche S.p.A., Milan, Italy

Filed Nov. 28, 1988, Ser. No. 276,680

Claims priority, application Italy, Dec. 16, 1987, 23037 A/87

Int. Cl.[4] C10L *15/00*

U.S. Cl. 44—627 **15 Claims**

1. A process for the beneficiation of coal by selective caking, characterized in that a caking mixture is employed consisting of:

one or more solvents selected among light hydrocarbons having boiling points not higher than 70° C.;

a non-ionic oil soluble additive obtained by controlled propoxylation of phenolic cuts derived from coke-oven tars;

possibly, one or more heavy co-caking agents selected among coal-derived oils having boiling points between 200° and 400° C., or the residual products of petroleum refining or mixtures of the same.

2. A process according to claim 1, wherein the solvent or the solvents is/are contained in amounts between 2% and 50% by weight with respect to coal, the additive is in amounts between 0.02 and 1% by weight with respect to coal, and the heavy co-caking agent or agents is/are in amounts between 0% and 3% by weight with respect to coal.

5. A process according to claim 1, wherein the propoxylated phenolic fractions are also ethoxylated.

4,881,947

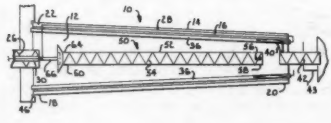
HIGH EFFICIENCY GASIFIER WITH RECYCLE SYSTEM

Thomas H. Parker, Depot St., P.O. Box 58, Richford, N.Y. 13835, and Virgil J. Flanigan, Route 5, Box 629, Rolla, Mo. 65401

Filed Jun. 28, 1988, Ser. No. 212,519

Int. Cl.[4] C10B *1/10*

U.S. Cl. 48—89 **3 Claims**



1. A gasifier for converting an organic solid feed material to a product gas, said gasifier comprising:

a rotary kiln for providing an essentially oxygen-free gasifying chamber, and having a generally horizontally extending longitudinal axis, an outer wall means radially spaced from said axis and defining said chamber therewithin, a receiving end and an opposing outlet end;

means for feeding an organic solid feed material to said kiln into said receiving end thereof;

radiant heating means in said chamber radially spaced from said axis, and extending longitudinally of the gasifying chamber for transferring heat to the feed material to pyrolyze the material and convert it to char, a highly catalytic ash, and a product gas as the material advances toward said outlet end;

conduit structure in said chamber extending from said outlet end to said receiving end for recycling a portion of the char and ash and thereby augmenting the heating of an incoming feed material, magnifying the percent of highly catalytic components in the ash, and extending the residence time to thereby improve gasification;

means adjacent said outlet end for loading the portion of the char and ash into said conduit structure in response to rotation of said kiln;

means at said outlet and for unloading the remainder of the char and ash and discharging the product gas from the kiln; and

fan means in said conduit structure for drawing a portion of the product gas from said outlet end through said structure to said receiving end to augment the recycling of the char and ash and the heating of incoming feed material, thereby improving gasification efficiency.

3. A gasifier for converting an organic solid feed material to a product gas, said gasifier comprising:

a rotary kiln for providing an essentially oxygen-free gasifying chamber, and having a generally horizontally extending longitudinal axis, an outer wall radially spaced from said axis and defining said chamber therewithin, a receiving end and an opposing outlet end;

said outer wall of said kiln being of generally conical configuration to provide said chamber with a progressively smaller cross-sectional area as said outlet end is approached;

means for feeding an organic solid feed material to said kiln into said receiving end thereof;

radiant heating means in said chamber radially spaced from said axis, and extending longitudinally of the gasifying chamber for transferring heat to the feed material to pyrolyze the material and convert it to char, ash and a product gas as the material advances toward said outlet end;

said radiant heating means including a plurality of circumferentially spaced, radiant tubes extending generally parallel to said wall and converging as said outlet end is approached, whereby to focus the radiant energy toward a heat load of advancing feed material; and

means at said outlet end for unloading the remainder of the char and ash and discharging the product gas from said kiln.

4,881,948

GAS SHUTOFF APPARATUS

Shinichi Nakane, Yamatokouriyama; Takashi Uno, Nara; Hiroshi Horii; Shinzo Kato, both of Katsushika; Mitsuo Namba, Machida, and Reppei Uematsu, Yokohama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma and The High Pressure Gas Safety Institute of Japan, Tokyo, both of, Japan

Filed Mar. 16, 1989, Ser. No. 324,055

Claims priority, application Japan, Mar. 17, 1988, 63-64011; Jun. 16, 1988, 63-148571

Int. Cl.[4] F23K *5/00*; G05D *7/00*

U.S. Cl. 48—192 **4 Claims**

1. A gas shutoff apparatus comprising:

flow rate measurement means for generating a flow rate signal corresponding to a flow rate of gas in a gas supply line,

consumption state detection means for detecting a consump-

tion state represented by flow rate and a consumption time of the gas on the basis of said flow rate signal,

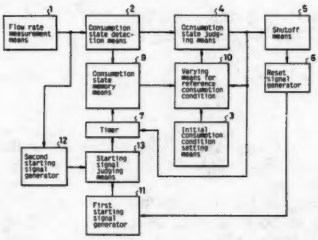
initial consumption condition setting means comprising a memory for storing a reference consumption condition as an initial condition,

consumption state judging means which compares said detected consumption state with said reference consumption condition and generates a gas shutoff signal in case that said consumption state exceeds from said reference consumption condition,

a timer for measuring a predetermined time period,

a first starting signal generator for generating a first starting signal,

a second starting signal generator for generating a second starting signal upon reception of a gas flow rate above a predetermined level,



a starting signal judging means which issues a timer-start signal to make said timer start counting when said second starting signal is received after reception of said first starting signal,

consumption state memory means for memorizing a consumption state during a time period given by operation of said timer and for producing a consumption condition on the basis of said memorized consumption state,

varying means for reference consumption condition for setting a varied reference consumption condition in said consumption state judging means,

shutoff means for interrupting said gas supply by reception of said shutoff signal, and

a reset signal generator for generating a reset signal to said first starting signal generator upon reception of signal of open-state from said shutoff means when it is opened.

4,881,949

METHOD OF STARTING A GASIFIER

Norbert Brüngel, Cologne, and Hermann-Josef Schumacher, Bedburg-West, both of Fed. Rep. of Germany, assignors to Rheinische Braunkohlenwerke AG., Cologne, Fed. Rep. of Germany

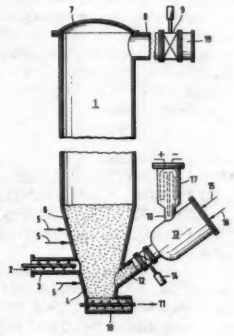
Filed Jul. 27, 1988, Ser. No. 224,855

Claims priority, application Fed. Rep. of Germany, Aug. 14, 1987, 3727146

Int. Cl.[4] C10J *3/54*

U.S. Cl. 48—197 R **5 Claims**

1. A method of starting a gasifier for the gasification of carbonaceous fuel by means of an oxygen-bearing gasification agent in a fluidised bed comprising filling the gasifier with an inert gas medium and putting it under an increased pressure, establishing gas-tight sealing integrity of the gasifier, and igniting a combustible gas mixture by means of an ignition device which operates under pressure, in a combustion chamber which communicates with the lower part of the gasifier, said mixture undergoing combustion substantially while maintaining the increased pressure at least until the temperature within



the gasifier at least substantially corresponds to the gasification temperature.

4,881,950

SILICON NITRIDE CUTTING TOOL

Deepak Bhat, Troy, and Dhirajlal Shah, Sterling Heights, both of Mich., assignors to GTE Valenite Corporation, Troy, Mich.

Continuation-in-part of Ser. No. 868,466, May 30, 1986, abandoned. This application Oct. 5, 1987, Ser. No. 104,695

Int. Cl.[4] B24D *3/04*

U.S. Cl. 51—307 **6 Claims**

1. A coated densified ceramic cutting tool comprising, a substrate body consisting essentially of a granular phase of alpha silicon nitride and silicon aluminum oxynitride, said granular phase being uniformly distributed in a matrix of a densification aid, selected from the group consisting of magnesium oxide, yttrium oxide, rare earth oxides, and mixture thereof, said matrix including uniformly distributed submicron particles consisting essentially of titanium nitride, said silicon aluminum oxynitride and said titanium nitride being formed during densification of said tool by reaction of titanium oxide with a portion of said silicon nitride to form titanium nitride and silicon oxide, a layer of refractory material, and an interfacial layer intermediate said substrate and said layer of refractory material, said interfacial layer comprising a titanium metal chemically reacted to form a reaction bonded titanium nitride for enhancing the adherence of said layer of refractory metal material to said substrate.

4,881,951

ABRASIVE GRITS FORMED OF CERAMIC CONTAINING OXIDES OF ALUMINUM AND RARE EARTH METAL, METHOD OF MAKING AND PRODUCTS MADE THEREWITH

Larry D. Monroe, Inver Grove Heights, and William P. Wood, Minneapolis, both of Minn., assignors to Minnesota Mining and Manufacturing Co., St. Paul, Minn.

Continuation-in-part of Ser. No. 54,619, May 27, 1987, abandoned. This application May 2, 1988, Ser. No. 188,744

Int. Cl.[4] B24D *3/02*

U.S. Cl. 51—309 **46 Claims**

1. Alumina-based ceramic abrasive grits having a ceramic composition selected from the group consisting of

(a) a first composition consisting of (1) up to 30% by weight yttria, (2) a reaction product of aluminum oxide and at least about 0.5% by weight of the oxide of a rare earth metal selected from the group consisting of praseodymium, samarium, ytterbium, neodymium, lanthanum, gadolinium, cerium, dysprosium, erbium, and mixtures of two

or more of such rare earth metals, and (3) alpha alumina making up the balance of 100% by weight; and

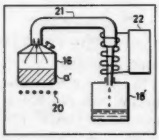
(b) a second composition comprising (1) up to 30% by weight of yttria, (2) a reaction product of aluminum oxide and at least about 0.5% by weight of the oxide of a rare earth metal selected from the group consisting of praseodymium, ytterbium, neodymium, lanthanum, gadolinium, dysprosium, erbium and mixtures of two or more of such rare earth metals, and (3) alpha alumina making up the balance of 100% by weight.

4,881,952

METHOD AND APPARATUS FOR DISPOSING DUST PRODUCED DURING AMORPHOUS SILICON FILM-FORMING PROCESS

Yasui Masaru, Yokohama, Japan, assignor to Stanley Electric Co., Ltd., Japan

Continuation of Ser. No. 897,157, Oct. 23, 1986, abandoned, which is a division of Ser. No. 733,948, May 14, 1985, Pat. No. 4,642,208. This application Sep. 22, 1988, Ser. No. 249,280
Claims priority, application Japan, May 16, 1984, 59-96653
Int. Cl.[4] B01D *3/00*
U.S. Cl. 55—1 **11 Claims**



1. A system for disposing of dust produced during a process of forming an amorphous silicon film by decomposing a starting material gas containing silane gas as its principal component, comprising:

a unit for collecting the dust including:

vacuum suction means coupled to a film-forming section to discharge the dust produced within said film-forming section to the outside of this section;

a dust-capturing section coupled to said vacuum suction means;

a dust hopper connected to said dust-capturing section to receive the captured dust; and

dumping means, provided at a bottom portion of said dust hopper, for dumping dust received in the dust hopper, said dumping means being adapted to receive a detachable mixing means; and

heat-distilling means, adapted to receive a detachable mixing means, for heating said mixing means; and

mixing means, adapted for detachably coupling to said dumping means and said heat-distilling means and including a heat-distillable liquid therein, for receiving dust from said dumping means when coupled to said dumping means and mixing said dust with said liquid to transform said dust to a slurry-form and for heating and distilling said liquid when coupled to said heating means to convert the slurry-form dust therein into a final disposal product comprising a solidified mass or pellets of dust.

4,881,953

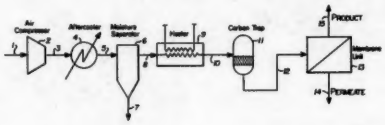
PREVENTION OF MEMBRANE DEGRADATION

Kamal Prasad, East Amherst, and Oscar W. Haas, North Tonawanda, both of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

Filed Sep. 15, 1988, Ser. No. 244,419
Int. Cl.[4] B01D *53/22, 53/04*
U.S. Cl. 55—16 **32 Claims**

1. In a process for the separation of a feed gas mixture in a membrane system capable of selectively permeating a more readily permeable component of said feed gas mixture containing said component and a less readily permeable component, in which said feed gas mixture contains contaminants comprising hydrocarbons heavier than C_5 (pentane) and lighter hydrocarbons of C_5 or less, the improvement consisting essentially of:

(a) contacting the feed gas mixture containing said contaminants with a bed of adsorbent material prior to passage to said membrane system, the bed of adsorbent material serving to selectively adsorb the heavier hydrocarbons, with continued selective adsorption of said heavier hydrocarbons from additional quantities of said feed gas mixture resulting in the displacement of lighter hydrocarbons of C_5 or less initially adsorbed from the feed gas mixture by said bed, lighter hydrocarbons thus passing through the bed of adsorbent material with said feed gas mixture, the adsorbent bed size/life being determined by said selective



adsorption of heavier hydrocarbons rather than the adsorption of both lighter and heavier hydrocarbon contaminants; and

(b) passing said feed gas mixture, together with said lighter hydrocarbons, removed from the bed of adsorbent material to the membrane system for the selective permeation of the more readily permeable component of the feed gas mixture, the presence of said lighter hydrocarbons not resulting in appreciable degradation of the permeability of the membrane,

whereby the significant degradation of membrane permeability otherwise caused by the presence of heavier hydrocarbons in the feed gas mixture is conveniently prevented, while the adsorbent material size/bed life are optimized for a given gas separation operation by the selective removal of only the heavier hydrocarbons detrimental to membrane permeability rather than the removal of both light and heavy hydrocarbons.

4,881,954

PERMEABLE MEMBRANES FOR ENHANCED GAS SEPARATION

Benjamin Bikson, Brookline; James E. Miller, Waltham, and Joyce K. Nelson, Lexington, all of Mass., assignors to Union Carbide Corporation, Danbury, Conn.

Filed Jul. 31, 1987, Ser. No. 80,476
Int. Cl.[4] B01D *53/22*
U.S. Cl. 55—16 **23 Claims**

1. In the process for the separation of a more readily permeable component of a feed gas mixture from a less readily permeable component thereof by contacting said feed gas mixture with the feed side of a composite membrane having gas separation characteristics, and separately withdrawing the more readily permeable component from the composite membrane as a permeate stream and said less readily permeable component as a non-permeate stream, the improvement comprising employing a composite membrane comprising:

(a) a porous polymeric support layer in asymmetric form, having a relatively thin, dense, semipermeable outer skin region and a less dense, porous non-selective support region that serves to preclude the collapse of the skin region under pressure, said skin region being capable of selectively permeating a more readily permeable component of the feed gas mixture to be separated at a desirably high permeation rate, wherein said porous support layer, after being produced in a desired porous form, washed and dried, is exposed in essentially dry form to an elevated temperature approaching the glass transition temperature

of the material of the support layer under non-swelling conditions for a period of time sufficient to modify the porous support layer to form asymmetry therein, with increased compaction resistance and collapse pressure, said time being insufficient to cause the collapse of said support layer; and

(b) a separation layer deposited on the outer skin region of said support layer without alteration of the structure of said support layer, said separation layer having a selectivity for said more readily permeable component greater than that of the material of the asymmetric support layer, the resulting composite membrane exhibiting separation characteristics equal to or higher than the intrinsic separation characteristics of the material of the asymmetric support layer, whereby said composite membrane exhibits enhanced gas permeability and separation characteristics in desired gas separation operations.

4,881,955

METHOD FOR GAS SEPARATION USING HELICALLY WOUND HOLLOW FIBERS PERMEABLE MEMBRANE CARTRIDGE

Benjamin Bikson, Brookline, and Slavatore Giglia, Norwood, both of Mass., assignors to Union Carbide Corporation, Danbury, Conn.

Filed Sep. 12, 1988, Ser. No. 242,602
Int. Cl.[4] B01D *53/22*
U.S. Cl. 55—16 **11 Claims**

1. A gas separation process for the separation of at least one fast gas component from a feed gas mixture containing such fast gas component and at least one other gaseous component in a permeator module containing a helically wound hollow fiber cartridge, said process comprising:

(a) passing the feed gas mixture to the permeator module so as to pass through the bores of the hollow fibers in said helically wound hollow fiber cartridge from a first feed end thereof, all of the hollow fibers in said permeable membrane cartridge being essentially of uniform length;

(b) recovering said fast gas component that permeates the hollow fibers as a permeate stream on the outer, permeate side of said hollow fibers, said permeate stream being passed from the permeator module in a permeate flow direction that is countercurrent to the direction of the feed gas mixture flow within the bores of the hollow fibers; and

(c) recovering a raffinate stream from the permeator module, said raffinate stream leaving the bores of the hollow fibers through a second, exit end thereof opposite the feed end thereof, said raffinate stream passing in a flow direction that is cocurrent to the direction of feed gas mixture flow within the bores of the hollow fibers, thereby maintaining (i) significant radial mixing of the permeate stream on the outer, permeate side of the hollow fiber permeable membrane cartridge and (ii) essentially no axial mixing on either (a) the outer permeate side or (b) in the bores of said hollow fiber permeable membrane cartridge.

4,881,956

METHOD AND DEVICE FOR CLEANING PARTICULATE-LADEN GASES

Dale G. Jones, Visalia, Calif., assignor to J. Edwards Enterprises, Visalia, Calif.

Continuation of Ser. No. 760,362, Jun. 28, 1985, abandoned. This application Mar. 6, 1987, Ser. No. 22,476
Int. Cl.[4] B01D *47/00*
U.S. Cl. 55—84 **8 Claims**

1. A method for scrubbing particulates from an air stream, said method employing a rotary spray scrubber including:

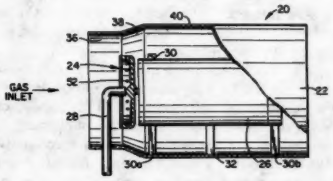
a substantially cylindrical duct which defines an axial flow path for the air stream;

a rotating dispersion hub having a substantially solid radial face rotatably mounted in the duct, said hub including a circular periphery having a plurality of radial passages;

wherein the cylindrical duct and the hub together define an annular passage therebetween, and wherein the ratio of the hub diameter to the duct diameter at said annular passage is in the range from abut 0.55 to 0.75;

said method comprising:

rotating the hub at a preselected rotational speed corresponding to a tangential hub velocity of at least about 500 ft/sec;



supplying liquid scrubbing medium to the passages in the hub so that a radial spray of droplets having a diameter of from 10 to 50 microns is directed to the annular passage between the hub and the duct; and

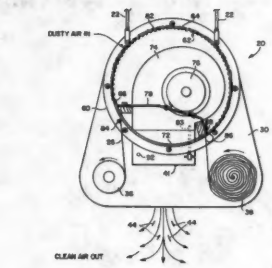
directing the air stream flow through the annular passage whereby the radial spray impacts the particulates to remove them from the air stream.

4,881,957

AIR FILTRATION UNITS AND METHODS EMPLOYING DUST AS FILTRATION MEDIA AND AIR FLOW RATE AS A DIRECTLY CONTROLLED PARAMETER

Frederick M. Shofner, Knoxville, Tenn., assignor to PPM, Inc., Knoxville, Tenn.

Filed Apr. 6, 1983, Ser. No. 482,604
Int. Cl.[4] B01D *33/00, 41/00*
U.S. Cl. 55—97 **12 Claims**



1. An air filtration unit comprising:

a unit housing formed at least in part of a rigid open mesh material defining an airflow inlet;

a motor-driven blower for drawing air into said housing through said rigid open mesh material and for forcibly discharging the air from said housing through a blower outlet;

a sheet of filter substrate media positioned on the outside of said rigid open mesh and supported thereby such that unfiltered air is drawn through said filter substrate media to thus expose said filter substrate media and form a mat thereon, and such that a mat thus formed serves as a filtration medium;

a controllable media-replenishment device connected to said sheet of filter substrate media for drawing exposed filter substrate media across and off said rigid open mesh at one portion thereof and simultaneously supplying clean filter

substrate media at another portion of said rigid open mesh; and

control system means connected to said media-replenishment device and responsive to the rate of airflow through said unit for substantially maintaining a predetermined rate of airflow through said media by activating said media replenishment device when sensed airflow decreases;

said control system means including means for maintaining an airflow rate such that the permeability of the mat filter is in the order of 200 CFM per ft^2 of open area at a static pressure drop of 2 inches WC.

8. A method for operating an air filtration unit including an opening defining an airflow passage, a motor-driven blower for drawing air through the opening and forcibly discharging the air, a sheet of filter substrate media supported over the opening such that unfiltered air is drawn through the filter substrate media to form a mat thereon and such that the mat thus formed serves as a filtration medium, and a controllable media-replenishment device for drawing exposed filter substrate media across and off the opening at one portion thereof and simultaneously supplying clean filter substrate media at another portion of the opening, said method comprising:

providing said air filtration unit;

sensing the rate of airflow through the opening; and

activating the media-replenishment device when sensed airflow decreases to substantially maintain a predetermined rate of airflow, and controlling the airflow rate such that the permeability of the mat filter is in the order of 200 CFM per ft^2 of open area at a static pressure drop of 2 inches WC.

4,881,958

ADSORPTION DEVICE FOR GAS SEPARATION

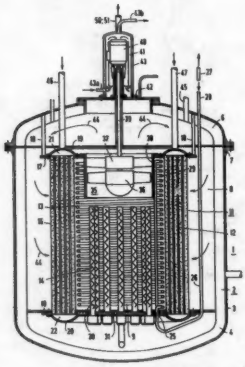
Bernd Eckardt, Bruchkoebel, and Thomas Burbach, Dietzenbach, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Sep. 6, 1988, Ser. No. 240,944

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1987, 3729517; European Pat. Off., Jul. 18, 1988, 88111539.8

Int. Cl.[4] B01D *53/04*

U.S. Cl. 55—179 **18 Claims**



1. Adsorption device for gas separation with an adsorbent, comprising a thermally insulated container, adsorber tubes with a given length being vertically disposed in said container, adsorbent disposed in said adsorber tubes, a heating device adjacent said adsorber tubes, cooling tubes disposed alongside said adsorber tubes and extending over substantially all of said given length for receiving coolant, and a gas circulation device in said container generating a gas flow encompassing said heating device, said cooling tubes and all of said given length of said adsorber tubes.

17. Adsorption system, comprising at least two parallel branches, and two adsorption devices each being connected in a respective one of said parallel branches, one of said adsorption devices functioning as an adsorber while the other of said adsorption devices is regenerated, each of said adsorption devices including a thermally insulated container, adsorber tubes with a given length being vertically disposed in said container, adsorbent disposed in said adsorber tubes, a heating device adjacent said adsorber tubes, cooling tubes disposed alongside said adsorber tubes and extending over substantially all of said given length for receiving coolant, and a gas circulation device in said container generating a gas flow encompassing said heating device, said cooling tubes and all of said given length of said adsorber tubes.

4,881,959

EXHAUST EMISSION PURIFIER FOR DIESEL ENGINES

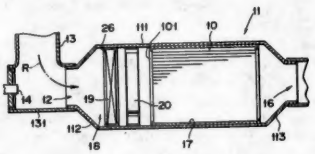
Yoichiro Kono, Tokyo; Yasuaki Kumagai, Yokohama; Nobuaki Takeda, Kawasaki, and Hiroshi Ogita, Yokohama, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 19, 1988, Ser. No. 221,091

Claims priority, application Japan, Jul. 20, 1987, 62-110991[U]; Oct. 20, 1987, 62-159272[U]; Oct. 20, 1987, 62-159273[U]

Int. Cl.[4] B01D *46/10*

U.S. Cl. 55—267 **15 Claims**



1. An exhaust emission purifier for use with a diesel engine having an exhaust emission passage, said exhaust emission purifier comprising:

(a) a particulate trap adapted to be disposed in the exhaust emission passage for entrapping particulates contained in exhaust gases emitted from the diesel engine;

(b) a canning container housing said particulate trap;

(c) an electric heater disposed in said canning container upstream of said particulate trap for heating the exhaust gases to a temperature which is high enough to burn particulates entrapped by said particulate trap; and

(d) a heat conductor/converter device disposed in said canning container upstream of said electric heater for absorbing heat radiated from said electric heater and discharging the absorbed heat into air flowing from a position upstream of said canning container into said particulate trap, wherein:

(e) said heat conductor/converter device comprises a cluster of exhaust gas passageways and

(f) said exhaust gas passageways have a passageway cross-sectional area greater in a lower portion of said heat conductor/converter device than in an upper portion of said heat conductor/converter device.

4,881,960

FRACTIONATION OF A HYDROCARBON MIXTURE

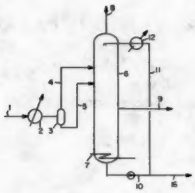
Gerhard Ranke, Poecking, and Elmar Diehl, Munich, both of Fed. Rep. of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Continuation of Ser. No. 893,517, Aug. 5, 1986, abandoned. This application Apr. 25, 1988, Ser. No. 188,129

Claims priority, application Fed. Rep. of Germany, Aug. 5, 1985, 3528071

Int. Cl.[4] F25J 3/00

U.S. Cl. 62—20 30 Claims



1. In a process for the fractionation of a gas comprising a mixture of hydrocarbons and inerts in a distillation column having at least one feed point to produce a gaseous overhead fraction containing lighter hydrocarbons and a bottoms product fraction containing heavier hydrocarbons, the improvement comprising the step of passing a physical scrubbing agent into an upper section of the column to scrub out from said gaseous overhead fraction containing lighter hydrocarbons, a heavier hydrocarbon fraction thereof which would otherwise be withdrawn from the column in said gaseous overhead fraction, thereby producing a gaseous overhead fraction containing a lower concentration of heavier hydrocarbons than would be the case without said scrubbing step, and wherein said scrubbing agent introduced into said upper column section contains at least a portion of said heavy hydrocarbon bottoms fraction.

4,881,961

CONTROL MANIFOLD INSERTED IN THE FLOW ROUTE OF A SYSTEM FOR TRANSFERRING PRESSURE MEDIA IN A GASEOUS AND/OR LIQUID GASEOUS STATE

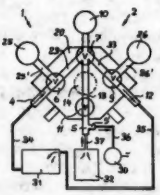
Bruno A. Mock, Buolterlistrasse 63, 6052 Hergiswil NW, Switzerland

Filed May 25, 1988, Ser. No. 198,328

Claims priority, application Switzerland, Jun. 4, 1987, 2121/87

Int. Cl.[4] F25B 45/00

U.S. Cl. 62—292 4 Claims



1. A control manifold comprising:

a casing of at least approximately a hexagonal shape having an upper and a lower narrow side parallel to one another, and a pair of sides each adjacent an end of said upper narrow side angled toward one another;

a closable low-pressure fitting extending into said casing at a low-pressure side thereof and connectable to a circulation system for a pressure medium;

a closable high-pressure fitting extending into said casing at a high-pressure side thereof and connectable to said circulation system;

a further closable fitting extending into said casing positioned between said low- and high-pressure fittings connectable to both a vacuum pump and a supply of said pressure medium;

respective shut-off valves in said casing connected to each of said fittings;

a further shut-off valve in said casing adjacent said upper narrow side;

respective conduit sections in said casing communication between said further shut-off valve and each of said shut-off valves connecting said low- and high-pressure fittings, each of said respective conduits running parallel to one of said angled sides of said casing; and

an approximately centrally positioned conduit section in said casing perpendicular to said upper narrow side communicating between said further shut-off valve and said shut-off valve connecting said further closable fitting.

4,881,962

METHOD OF AND APPARATUS FOR BENDING AND TEMPERING GLASS SHEETS

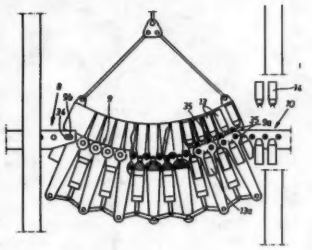
Pauli T. Reunamäki, and Järvinen, both of Tampere, Finland, assignors to O/Y Kyro A/B Tamglass, Tampere, Finland

Filed Sep. 22, 1987, Ser. No. 99,722

Claims priority, application Finland, Sep. 22, 1986, 863826

Int. Cl.[4] C03B 23/023

U.S. Cl. 65—104 20 Claims



1. A method of bending a glass sheet to be tempered, comprising the steps of:

carrying a glass sheet on horizontal rollers;

heating a glass sheet for bending and tempering;

curving a heated glass sheet around an axis of curvature transverse to a traveling direction of the glass sheet;

tempering a heated curve glass

sheet while reciprocating or oscillating said heated curved glass sheet in a longitudinal direction by the rollers carrying the glass sheet,

said step of curving a heated glass sheet around an axis of curvature transverse to the traveling direction being effected such that each point in a glass sheet is curved substantially at the same rate to provide a substantially constant radius of curvature at any given instant of time over the entire glass sheet area while moving said glass sheet by the rollers.

7. A bending and tempering apparatus for glass sheets, comprising a loading station, a heating furnace, a bending and tempering section, an unloading station, heating means in said heating furnace for heating glass sheets, chilling means in said bending and tempering section for tempering a bent glass

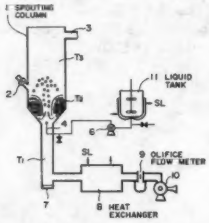
sheet, roller conveyors having horizontal rollers for carrying glass sheets from said loading station to said unloading station through said heating furnace and through said bending and tempering section, drive means for operating the roller conveyors, said drive means adapted to drive said roller conveyors in an oscillating fashion in at least a bending and tempering section roller conveyor, wherein rollers of said bending and tempering section roller conveyor are carried by first and second support members that are connected together to form support means, said support means extending in a traveling direction of a glass sheet and being curvable around an axis of curvature transverse to said traveling direction according to a variable angle between pairs of individual first and second support members of said support means, said variable angle being adjustable by lever arms and power units.

4,881,963

GRANULER FERTILIZER WITH A DEGRADATIVE COATING

Toshio Fujita; Yoshisato Yamashita; Shigemitsu Yoshida, and Katsutoshi Yamahira, all of Minamatashi, Japan, assignors to Chisso Corporation, Osaka, Japan

Filed Jun. 22, 1987, Ser. No. 64,576
Int. Cl.[4] C05G *3/10*
U.S. Cl. 71—64.07 **9 Claims**



1. A granular fertilizer with a degradative coating comprising as its active ingredients an ethylene-carbon monoxide copolymer and at least one resin selected from the group consisting of rubbery resins and ethylene-vinyl acetate copolymer resins, the carbon monoxide content of the ethylene-carbon monoxide copolymer being within the range of 0.1 to 10% by weight, the mixing proportion of the ethylene-carbon monoxide copolymer being at least 3% by weight of the coating and the mixing proportion of the rubbery resin or ethylene-vinyl acetate copolymer being at least 2% by weight of the coating.

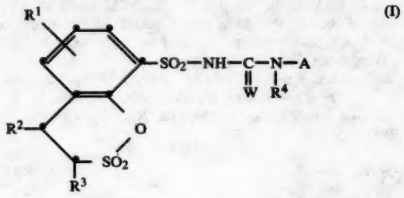
4,881,964

N-HETEROCYCLOSULFONYL-N'-PYRIMIDINYLUREAS

Werner Föry, and Willy Meyer, both of Riehen, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 872,799, Jun. 11, 1986, Pat. No. 4,759,791. This application May 24, 1988, Ser. No. 198,031
Claims priority, application Switzerland, Jun. 18, 1985, 2566/85; Mar. 5, 1986, 894/86
Int. Cl.[4] C07D *411/12*; A01N *43/54*
U.S. Cl. 71—91 **14 Claims**

1. An N-(3,4-dihydro-2,2-dioxo-1,2-benzoxathiin-8-ylsulfonyl)-N'-pyrimidinylurea of formula I



(I)

wherein

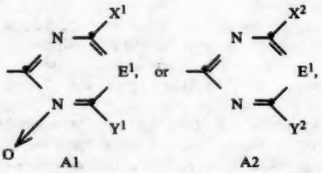
R^1 is hydrogen, halogen, nitro, C_1–C_4alkyl, C_1–C_4haloalkyl, C_1–C_4alkoxy, C_1–C_4haloalkoxy, C_1–C_4alkoxycarbonyl, C_1–C_4alkylthio, C_1–C_4alkylsulfinyl, C_1–C_4alkylsulfonyl or C_2–C_5alkoxyalkoxy,

R^2 and R^3 are each independently of the other hydrogen or C_1–C_4alkyl,

R^4 is hydrogen, methyl or ethyl,

W is oxygen or sulfur, and

A is a radical

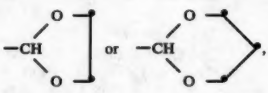


in which formulae

X^1, X^2 and Y^1 are each independently halogen, C_1–C_4haloalkoxy, C_1–C_4haloalkyl, C_1–C_4alkoxy, C_1–C_4alkyl, dimethylamino, methylamino, ethylamino, amino or C_2–C_4alkoxyalkyl,

E^1 is the methine bridge,

Y^2 is cyclopropyol, dimethoxymethyl, diethoxymethyl,



or salt thereof, with the proviso that R^3 is C_1–C_4alkyl if A is A2.

9. A herbicidal and plant growth inhibiting composition which contains, as active ingredient, an effective amount of a substituted sulfonylurea of formula I according to claim 1, together with a carrier or other adjuvant.

4,881,965

WHEAT GROWING PROCESS UTILIZING SELECTIVE HEREBICIDE

Susumu Yamamoto; Takuya Kakuta; Toshiaki Sato; Katsushi Morimoto, all of Funabashi; Eiichi Oya, Narashino; Takashi Ikai, Tokyo, and Tsutomu Nawamaki, Yono, all of Japan, assignors to Nissan Chemical Industries, Ltd., Tokyo, Japan

Division of Ser. No. 814,568, Dec. 30, 1985, abandoned. This application Jan. 25, 1988, Ser. No. 147,651
Claims priority, application Japan, Jan. 18, 1985, 60-6800; Apr. 13, 1985, 60-78784; Oct. 22, 1985, 60-236780
Int. Cl.[4] A01N *43/54*; C07D *401/14*
U.S. Cl. 71—92 **6 Claims**

1. A process for growing wheat and selectively preventing or controlling the growth of wild oats in the same site in which the wheat is being cultivated which comprises applying to said site an amount of an active compound sufficient to control the

growth of wild oats without adversely affecting the growth of the wheat, said active compound being N-[(4,6-dimethylpyrimidin-2-yl)aminocarbonyl]-4-methoxycarbonyl-3-methyl-1-(2-pyridyl)pyrazole-5-sulfonamide or N-[(4,6-dimethylpyrimidin-2-yl)aminocarbonyl]-4-methoxycarbonyl-1-(2-pyridyl)pyrazole-5-sulfonamide.

4,881,966

USE OF QUINOLINE DERIVATIVES FOR THE PROTECTION OF CULTIVATED PLANTS

Andreas Nyffeler, and Adolf Hubele, both of Maden, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

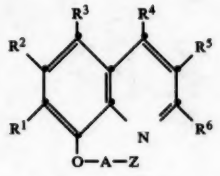
Continuation of Ser. No. 829,600, Feb. 13, 1986, abandoned. This application Mar. 30, 1988, Ser. No. 178,805

Claims priority, application Switzerland, Feb. 14, 1985, 682/85; Dec. 2, 1985, 5132/85

Int. Cl.[4] A01N *43/42*

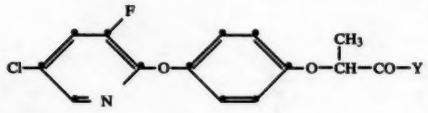
U.S. Cl. 71—94 **8 Claims**

1. A process for selectively controlling *Avena ludoviciana,* and *Lolium perenne* in cereal crops, which process comprises treating the cereal crops, parts of the cereal crops or cultivated by for the cereal crops with an effective amount of an antidote of formula I



(I)

wherein R^1, R^2, R^4, R^5 and R^6 are hydrogen,
R^3 is hydrogen or chlorine,
A is $—CH_2—$,
Z is $COOR^{12}$ and
R^{12} is an alkyl group of 4 to 11 carbon atoms and an effective amount of a herbicide of formula II



(II)

wherein
Y is $—OR^{18}$ and
R^{18} is C_3–C_9 alkynyl.

4,881,967

HETEROCYCLIC 2,3-DIHYDROBENZOFURAN HERBICIDES

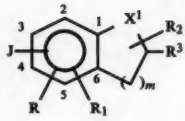
Joseph E. Semple, Wilmington, Del., assignor to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 943,365, Dec. 10, 1986, abandoned. This application Jun. 2, 1988, Ser. No. 202,086

Int. Cl.[4] C07D *407/04, 405/04;* A01N *43/707, 43/653, 43/38, 43/42*

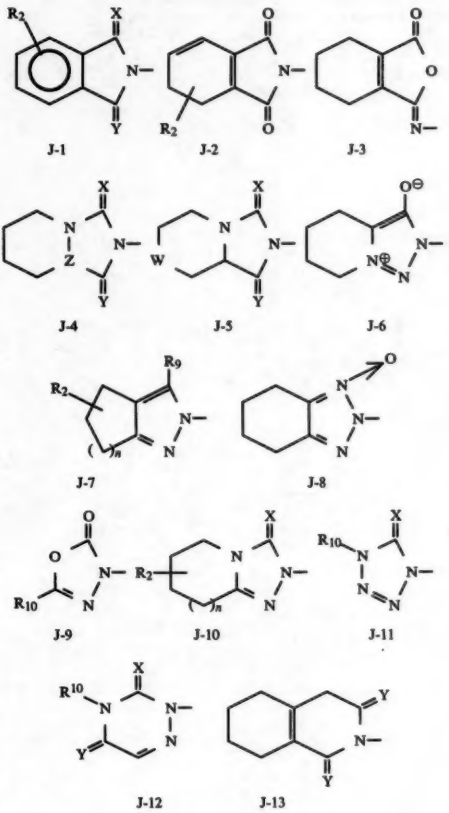
U.S. Cl. 71—92 **33 Claims**

1. A compound of the formula



I

wherein,
R is H, Cl, F, C_1–C_2 alkyl or C_1–C_3 alkoxy;
R_1 is H, F, Cl, Br, CH_3, OCH_3, CN, CF_3, OCF_3 or OCF_2H;
X^1 is O
R_2 is H, CH_3 or CH_2CH_3;
R_3 is H, C_1–C_4 haloalkyl, CR_2R_7CN, CN, $CR_2R_4R_7$, COCl, COR_4, $C(NOR_6)R_2$, CO_2R_4, $CONR_4R_2$, CHR_2OH, $CO_2(CH_2)_2SI(CH_3)_3$, $CONR_2SO_2CH_3$, $CHR_2CO_2R_4$, $CONHCH(CH_3)CONHCH(CH_3)CO_2CH_3$, CHR_2COR_4, $CHR_2OSO_2(C_1$–C_4 alkyl), $CHR_2OC(O)R_4$, $CHR_2OC(O)N(R_2)_2$, $CHR_2OC(O)N(R_2)OCH_3$, $CHR_2OC(O)N(R_2)Ph$, $HC{=}CH_2$ or $C{\equiv}CH$;
R_4 is H, C_1–C_4 alkyl, C_1–C_4 haloalkyl, C_2–C_6 alkenyl, C_3–C_6 alkynyl, C_2–C_4 haloalkenyl, phenyl, C_1–C_4 alkylphenyl, C_3–C_6 alkoxycarbonylalkyl or $(CH_2CH_2O)_6R_2$;
b is 1 to 6;
m is 1; n is 1 or 2
J is



J-1 J-2 J-3

J-4 J-5 J-6

J-7 J-8

J-9 J-10 J-11

J-12 J-13

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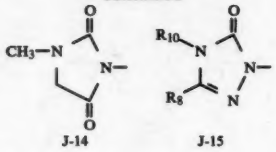


J-14 J-15

wherein

X and Y each is O or S;

Z is C or N;

W is S or SO_2;

R_6 is H, C_1–C_5 alkyl, allyl, propargyl, benzyl, $CH_2CO_2CH_3$ or $CH_2CO_2CH_2CH_3$;

R_7 is H or CH_3;

R_8 is Cl, C_1–C_4 alkyl or C_1–C_4 haloalkyl;

R_9 is Cl, F, Br, CH_3, CN, OCH_3, SCH_3 or SO_2CH_3; and

R_{10} is C_1–C_4 alkyl or C_1–C_4 haloalkyl.

17. A composition suitable for controlling the growth of undesired vegetation which comprises an effective amount of a compound of claim 1 and at least one of the following: surfactant, solid or liquid diluent.

4,881,968

HERBICIDAL SULFONAMIDES

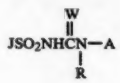
Mark E. Thompson, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 5, 1987, Ser. No. 117,769

Int. Cl.[4] A01N *43/54;* **C07D** *239/64, 401/12, 403/12*

U.S. Cl. 71—92 **37 Claims**

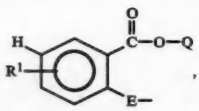
1. A compound selected from



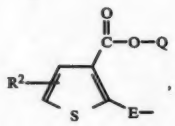
I

wherein

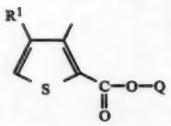
J is



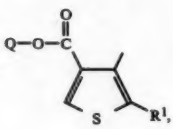
J-1



J-2



J-3



J-4

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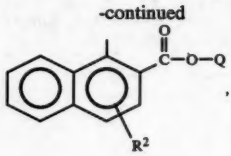
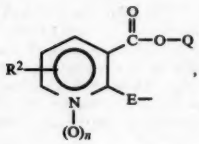
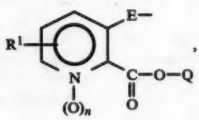


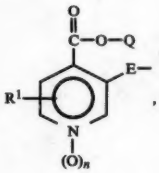
J-5



J-6



J-7



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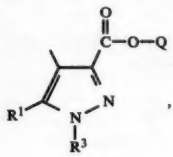
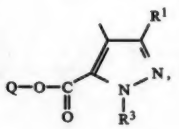
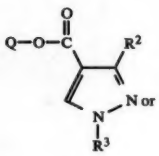


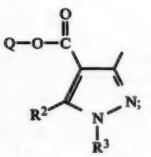
J-9



J-10

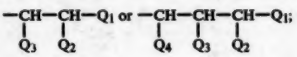


J-11

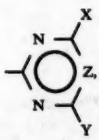


J-12

Q is

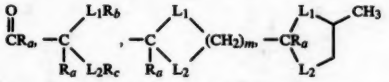


Q_1 is N_3, SCN or NO_2;
Q_2, Q_3 and Q_4 are independently H or CH_3;
E is a single bond or $—CH_2—$;
R is H or CH_3;
W is O or S;
R^1 is H, C_1–C_3 alkyl, C_1–C_3 haloalkyl, halogen, CN, nitro, C_1–C_3 alkoxy, C_1–C_3 haloalkoxy, $C_1$14 C_3 alkylthio, C_1–C_3 alkylsulfinyl, C_1–C_3 alkylsulfonyl, SCF_2H, NH_2, $NHCH_3$, $N(CH_3)_2$ or C_1–C_2 alkyl substituted with one C_1–C_2 alkoxy, C_1–C_2 haloalkoxy, SH, SCH_3, CN or OH;
R^2 is H, F, Cl, Br, C_1–C_2 alkyl, C_1–C_2 haloalkyl or C_1–C_2 alkoxy;
R^3 is H, C_1–C_3 alkyl, C_1–C_2 haloalkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, CH_2CN, phenyl or phenyl substituted by F, Cl, CH_3 or OCH_3;
n is 0 or 1;
A is



A-1

X is H, C_1–C_4 alkyl,
C_1–C_4 alkoxy, C_1–C_4 haloalkoxy,
C_1–C_4 haloalkyl, C_1–C_4 haloalkylthio,
C_1–C_4 alkylthio, halogen, C_2–C_5 alkoxyalkyl,
C_2–C_5 alkoxyalkoxy, amino, C_1–C_3 alkylamino, di(C_1–C_3alkyl)amino or C_3–C_5 cycloalkyl;
Y is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 haloalkoxy, C_1–C_4 haloalkylthio, C_1–C_4 alkylthio, C_2–C_5 alkoxyalkyl, C_2–C_5 alkoxyalkoxy, amino, C_1–C_3 alkylamino, di(C_1–C_3 alkyl)amino, C_3–C_4 alkenyloxy, C_3–C_4 alkynyloxy, C_2–C_5 alkylthioalkyl, C_1–C_4 haloalkyl, C_2–C_4 alkynyl, azido, cyano, C_2–C_5 alkylsulfinylalkyl, C_2–C_5 alkylsulfonylalkyl,



CH_2CN, $CH_2CO_2CH_3$, CH_2OH or $N(OCH_3)$ CH_3;
m is 2 or 3;
L_1 and L_2 are independently O or S;
R_a is H or C_1–C_3 alkyl;
R_b and R_c are independently C_1–C_3 alkyl;
Z is CH
and their agriculturally suitable salts; provided that
(a) when X is Cl, F, Br or I, then Y is OCH_3, OC_2H_5, $N(OCH_3)CH_3$, $NHCH_3$, $N(CH_3)_2$ or OCF_2H;
(b) when W is S, then R is H, A is A–1 and Y is CH_3, OCH_3, OC_2H_5, CH_2OCH_3, C_2H_5, CF_3, SCH_3, $OCH_2CH{=}CH_2$, $OCH_2C{\equiv}CH$, $OCH_2CH_2OCH_3$, $CH(OCH_3)_2$ or 1,3 -dioxolan-2-yl; and
(c) Q_2, Q_3 and Q_4 are not simultaneously methyl.

23. A composition suitable for controlling the growth of undesired vegetation which comprises an effective amount of a compound of claim 1 and at least one of the following: surfactant, solid or liquid diluent.

4,881,969

SULFONAMIDES

Thomas Saupe, Bammental; Gerhard Kiebe; Ulrich Schirmer, both of Heidelberg; Gerhard Paul, Ludwigshafen; Reiner Kober, Fussgoenheim; Bruno Wuerzer, Otterstadt; Rainer Berghaus, Mutterstadt; Norbert Meyer, Ladenburg, and Karl-Otto Westphalen, Speyer, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

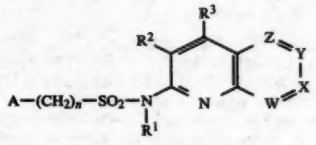
Filed Feb. 15, 1989, Ser. No. 310,753

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1988, 3804990

Int. Cl.[4] C07D *471/02*

U.S. Cl. 71—94 **7 Claims**

1. Sulfonamides of the general formula I



I

where the substituents and indices are defined as follows:
R^1 is hydrogen, cyano,
C_1–C_8-alkyl which may be substituted by one of the following radicals: C_1–C_2-alkoxy, C_1–C_2-alkylthio, aryl, aryloxy, arylthio, hetaryl, hetaryloxy and hetarylthio,
C_2–C_5-alkenyl,
C_2–C_4-alkynyl,
COR^4, where R^4 is C_1–C_4-alkyl, C_1–C_4-alkoxy, C_1–C_4-alkylthio, aryl, aryloxy, arylthio, aryl-C_1–C_4-alkoxy, hetaryl, hetaryloxy, hetarylthio or hetaryl-C_1–C_4-alkoxy,
$CONR^5R^6$, where R^5 and R^6 are identical or different and each denotes hydrogen, C_1–C_4-alkyl, C_3–C_6-cycloalkyl, C_2–C_5-alkenyl, aryl, hetaryl, aryl-C_1–C_4-alkyl, hetaryl-C_1–C_4-alkyl or C_1–C_4-alkylcarbonyl or together denote a C_2–C_6-alkylene chain,
or SO_mR^4, where m is 1 or 2 and R^4 is as defined above;
R^2, R^3 are identical or different and each denotes nitro, hydroxy, carboxy, mercapto or halogen,
C_1–C_4-alkyl, which may be monosubstituted by hydroxyl, mercapto, amino, aryloxy or hetaryloxy and/or monosubstituted, disubstituted or trisubstituted by halogen,
C_3–C_6-cycloalkyl, which may be monosubstituted, disubstituted or trisubstituted by halogen, hydroxyl, mercapto and/or C_1–C_4-alkyl,
C_3–C_6-cycloalkoxy,
C_3–C_6-cycloalkylthio,
C_2–C_5-haloalkenyl,
C_2–C_4-haloalkynyl,
C_1–C_4-alkoxy, which may be monosubstituted, disubstituted or trisubstituted by halogen and/or monosubstituted by aryl or hetaryl,
C_1–C_4-alkylthio, which may be monosubstituted, disubstituted or trisubstituted by halogen and/or monosubstituted by aryl or hetaryl,
C_2–C_5-alkenyloxy,
C_2–C_4-alkynyloxy,
$—NR^5R^6$, where R^5 and R^6 are each as defined above, or one of the groups mentioned under R^1,
W is N,
X, Y, Z each denote a group of the formula

where R^7 is hydrazino or one of the groups mentioned under R^2

although X, Y, Z and W are not simultaneously nitrogen,

n is 0 or 1 and

A is aryl or hetaryl, which each may carry from one to five halogen atoms and/or from one to three of the following substituents:

—SO_2R^8, where R^8 is hydroxy, C_1–C_4-alkoxy, aryl-C_1–C_4-alkoxy, aryloxy, hetaryloxy, hetaryl-C_1–C_4-alkoxy or —NR^5R^6, where R^5 and R^6 are each as defined above, and/or

the groups mentioned under R^2,

and the salts and N-oxides thereof, except the compounds of the formula I where A is 4-aminophenyl, n is 0, R^1, R^2 and R^3 are each hydrogen, W is nitrogen, X, Y and Z are each carbon, and the R^4's on X and Z are each methyl and otherwise hydrogen, and the 4-aminophenyl reaction products thereof.

4,881,970

TETRAHYDROPTHALIMIDE COMPOUNDS, AND THEIR PRODUCTION AND USE AS HERBICIDES

Eiki Nagano, Hyogo; Shunichi Hashimoto, Osaka; Ryo Yoshida, Hyogo; Hiroshi Matsumoto, and Katsuzo Kamoshita, both of Osaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation of Ser. No. 887,970, Jul. 21, 1986, Pat. No. 4,770,695, which is a continuation of Ser. No. 445,726, Nov. 30, 1982, abandoned. This application Sep. 30, 1987, Ser. No. 102,617

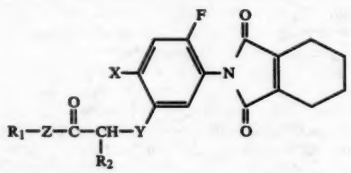
Claims priority, application Japan, Dec. 25, 1981, 56-212396; Jan. 29, 1982, 57-13845; Feb. 5, 1982, 57-17858; Mar. 23, 1982, 57-46940; May 6, 1982, 57-76306

The portion of the term of this patent subsequent to Sep. 13, 2005, has been disclaimed.

Int. Cl.[4] A01N *43/38*; C07D *209/48*

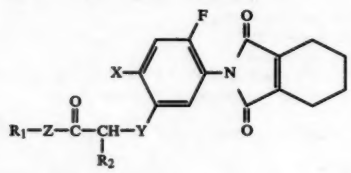
U.S. Cl. 71—96 **53 Claims**

1. A compound of the formula:



wherein R_1 is hydrogen, alkyl, lower cycloalkyl, lower alkyl(-lower)cycloalkyl, lower cycloalkyl(lower)alkyl, lower alkoxy(lower)alkyl, lower alkenyl, lower cycloalkenyl, lower cycloalkenyl(lower)alkyl, phenyl, cyano(lower)alkyl, lower alkynyl, lower alkylideneamino, lower alkylthio(lower)alkyl, benzyl, halo(lower)alkyl or lower cycloalkylideneamino, R_2 is lower alkyl or lower alkoxy, X is chlorine or bromine, Y is oxygen or imino and Z is oxygen or sulfur.

2. A herbicidal composition which comprises a herbicidally effective amount of a compound of the formula:



wherein R_1 is hydrogen, alkyl, lower cycloalkyl, lower alkyl(-lower)cycloalkyl, lower cycloalkyl(lower)alkyl, lower alkoxy(lower)alkyl, lower alkenyl, lower cycloalkenyl, lower cycloalkenyl(lower)alkyl, phenyl, cyano(lower)alkyl, lower alkynyl, lower alkylideneamino, lower alkylthio(lower)alkyl, benzyl, halo(lower)alkyl or lower cycloalkylideneamino, R_2 is lower alkyl or lower alkoxy, X is chlorine or bromine, Y is oxygen or imino and Z is oxygen or sulfur as an active ingredient and an inert carrier.

4,881,971

REFINING OF LEAD-DEBISMUTHIZING

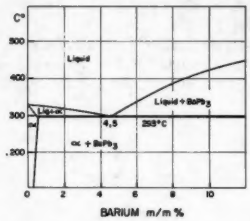
Michael J. Thom, 50 William Chadwick Drive, Eshowe, 3815, South Africa

Filed May 2, 1988, Ser. No. 189,125

Claims priority, application South Africa, Feb. 3, 1988, 88/0749

Int. Cl.[4] C22B *13/08*

U.S. Cl. 75—78 **6 Claims**



1. A method of removing bismuth from lead which includes the steps of dissolving barium sulfide in a molten mixture of at least two of $BaCl_2$, BaF_2, $CaCl_2$, CaF_2, KCl and NaCl; electrolyzing the mixture using a molten lead cathode; collecting a barium alloy at the cathode, adding the barium alloy to a molten bath of the lead, cooling the melt, and removing bismuth-containing dross from the melt, or tapping molten lead from the melt, thereby leaving the dross behind.

4,881,972

PROCESS FOR FEEDING HEAT ENERGY INTO A MOLTEN METAL BATH

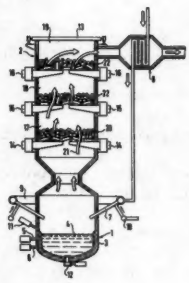
Ralph G. Weber, Rio de Janeiro, and William Wells, Sao Paulo, both of Brazil, assignors to Kortec AG, Switzerland

Filed Oct. 14, 1988, Ser. No. 578,477

Claims priority, application Fed. Rep. of Germany, Oct. 16, 1987, 3735150

Int. Cl.[4] C22B *9/00*

U.S. Cl. 75—93 G **23 Claims**



1. A process of feeding heat energy into a molten metal bath formed by melting solid metal pieces in a crucible, comprising the steps of: charging solid carbon inside a plurality of sheet metal containers into the metal bath in the crucible, the sheet

metal of the containers being selected such that the melting point thereof is within a range in which the solid metal pieces melt down; and pressing the sheet metal container down into the metal bath by means of solid metal pieces lying thereabove, while injecting oxygen into the metal bath.

4,881,973

LIFE SILVER RECOVERY SYSTEM

James E. Williams, Fletcher, N.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 1, 1988, Ser. No. 151,302

The portion of the term of this patent subsequent to Apr. 26, 2005, has been disclaimed.

Int. Cl.[4] C22B *11/04*

U.S. Cl. 75—118 P 9 Claims

1. A process for the recovery of silver from spent, waste acidic silver halide photographic processing fluid which comprises passing said waste processing fluid through finely divided iron and a metal salt of copper or cadmium wherein the weight ratio of iron to said metal salt is in a range from 25:1 to 4:1 and wherein the pH of said acidic silver halide processing fluid is raised prior to contact with the iron and the metal salt.

4,881,974

SILVER-GLASS PASTE

Thomas Herrington, Romona, Calif., assignor to Johnson Matthey, Inc., Valley Forge, Pa.

Filed Nov. 5, 1987, Ser. No. 116,949

Int. Cl.[4] C09D *5/00*; B22F *1/00*

U.S. Cl. 106—1.14 4 Claims

1. A silver-glass paste consisting essentially of, on a weight basis, 55–75% silver flake, 0.5–2% silver oxide, 10–25% lead borate glass, 0.5–2% resin, 0.5–2% thixotrope and solvent, the thixotrope being hydrogenated castor oil.

4,881,975

PRODUCTS FOR TREATING SURFACES

John R. Collier, Hednesford, and Kenneth U. Holker, Kidderminster, both of England, assignors to Albright & Wilson Limited, Warley, England

Filed Dec. 21, 1987, Ser. No. 135,437

Claims priority, application United Kingdom, Dec. 23, 1986, 8630740; Feb. 17, 1987, 8703583; Jul. 21, 1987, 8717231

Int. Cl.[4] C04B *9/02*; B05D *1/36*

U.S. Cl. 106—14.05 17 Claims

1. A process for coating a surface which comprises applying thereto an acidic aqueous dispersion consisting essentially of an acidic trivalent metal compound, in which the metal is iron or aluminium or a mixture thereof, and dispersed silica with a silicon to trivalent metal atom ratio of 5.5–30:1, or a reaction product of said compound and silica, and drying said dispersion on the surface to leave a coated surface with a coating weight of 20–5000 mg/m^2.

4,881,976

ANTIFOULING PAINTS CONTAINING MATRICES CROSS-LINKED WITH LANTHANIDES AND METHODS OF MAKING AND USE

Peter S. Gradeff, Pottersville, N.J., assignor to Rhone-Poulenc Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 121,646, Nov. 17, 1987, abandoned. This application Oct. 18, 1988, Ser. No. 259,284

Int. Cl.[4] C09D *5/14*

U.S. Cl. 106—15.05 20 Claims

1. An antifoulant additive composition comprising a matrix selected from the group consisting of finely divided wood fibers, or wood pulp, lignin, lignin derivatives, wood rosin, modified rosin, and combinations thereof, in combination with one or more numbers of the group consisting of lanthanide elements and lanthanide element derivatives bonded to said matrix.

4,881,977

WATER-SOLUBLE YELLOW MONOAZO DYESTUFFS

Wolfgang Bauer, Maintal; Willi Steckelberg, and Josef Ritter, both of Hofheim, all of Fed. Rep. of Germany, assignors to Cassella Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

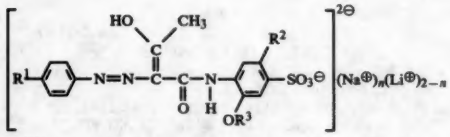
Filed Sep. 19, 1988, Ser. No. 245,897

Claims priority, application Fed. Rep. of Germany, Oct. 16, 1987, 3735078

Int. Cl.[4] C09D *11/02*; C09B *29/00*

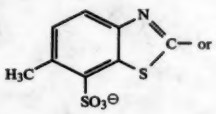
U.S. Cl. 106—22 10 Claims

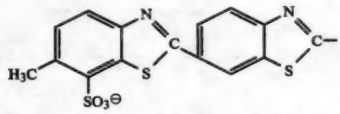
1. Water soluble yellow monoazo dyestuffs of the formula



wherein

R^1 is a moiety of the formula





R^2 is methyl, ethyl, methoxy or ethoxy,

R^3 is methyl or ethyl and

n is a number from 0.3 to 1.7.

4,881,978

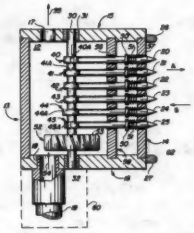
HAND HELD SWIMMING POOL TILE DESCALER

Charles A. Van Horssen, 9233 N. 12 Avenue, Phoenix, Ariz. 85021

Filed Jan. 4, 1988, Ser. No. 140,720

Int. Cl.[4] C23G *3/00*; B08B *1/04*

U.S. Cl. 134—16 2 Claims



1. Hand-held apparatus for removing scale from the tile on a swimming pool, said apparatus including

(a) a housing;

(b) a plurality of pins mounted for reciprocation in said housing, each pin including a distal end which at the

farthest extent of reciprocation of said pin extends outwardly from said housing;

(c) at least one blade operatively associated with a shaft rotatably mounted in said housing;

(d) first orifice means for directing fluid under pressure into said housing against said blade to displace said blade and rotate said shaft;

(e) transmission means operatively associated with said shaft for selectively sequentially applying motive power to said pins to force said pins against said scale; and,

(f) second orifice means permitting fluid entering said housing through said first orifice means to exit said housing.

4,881,979

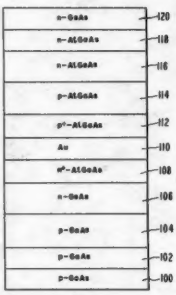
JUNCTIONS FOR MONOLITHIC CASCADE SOLAR CELLS AND METHODS

Carol L. R. Lewis, Palo Alto, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Continuation-in-part of Ser. No. 15,538, Feb. 13, 1987, Pat. No. 4,771,321, which is a continuation of Ser. No. 837,877, Mar. 5, 1986, abandoned, which is a continuation of Ser. No. 645,181, Aug. 29, 1984, abandoned. This application Mar. 22, 1988, Ser. No. 171,629

Int. Cl.[4] H01L *35/34, 37/00*

U.S. Cl. 136—201 **20 Claims**



1. A method of forming a monolithic cascade solar cell including sub-cells of different radiation converting bandgaps comprising the steps of:

forming a first radiation converting solar sub-cell having a first bandgap on a substrate;

forming an interconnecting thin layer of gold over said first sub-cell, said thin layer of gold being substantially transparent to wavelengths of radiation having frequency matching the bandgap of said first radiation converting sub-cell; and

forming at least one more radiation converting solar sub-cell having a second bandgap over said interconnecting thin layer of gold.

4,881,980

PIGMENTS OF THE QUINACRIDONEQUINONE SERIES, PROCESSES FOR THEIR PREPARATION AND THEIR USE

Erwin Dietz, Kelkheim, and Frank Prokschy, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

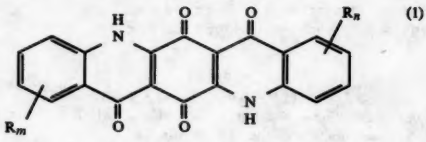
Filed Jul. 9, 1987, Ser. No. 71,750

Claims priority, application Fed. Rep. of Germany, Jul. 11, 1986, 3623336

Int. Cl.[4] C09B *48/00, 67/52*

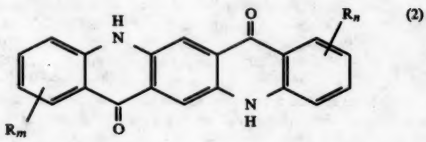
U.S. Cl. 106—495 **12 Claims**

1. A substantially nickel free pigment of the quinacridonequinone series consisting essentially of 98-20 mol percent of a quinacridonequinone of the formula (1)



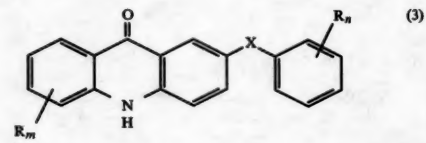
(1)

in which R denotes a hydrogen or chlorine atom or a methyl or carboxamide group and m and n are 1 or 2, and 1–65 mol percent of a quinacridone of the formula (2)

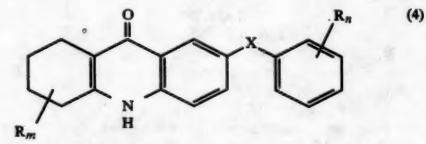


(2)

in which R, m and n have the abovementioned meaning, and 1–15 mol percent of one or two acridone derivatives of the formulae (3) and/or (4)



(3)



(4)

in which X denotes O or NH and the symbols R can be identical or different and, like m and n, have the abovementioned meaning, the added compounds of the formulae (2), (3) and/or (4) being predominantly incorporated into the crystal lattice of the quinacridonequinone of the formula (1).

4,881,981

METHOD FOR PRODUCING A SHAPE MEMORY ALLOY MEMBER HAVING SPECIFIC PHYSICAL AND MECHANICAL PROPERTIES

Paul E. Thoma, Wauwatosa; David N. AbuJodom, II, Brookfield, and Sepehr Fariabi, Shorewood, all of Wis., assignors to Johnson Service Company, Milwaukee, Wis.

Filed Apr. 20, 1988, Ser. No. 183,818

Int. Cl.[4] C22F *1/10*

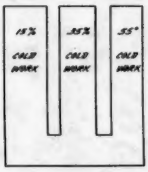
U.S. Cl. 148—11.5 R **25 Claims**

1. A process for adjusting the physical and mechanical properties of a shape memory alloy member of a known chemical composition, said process comprising the steps of

annealing said member to a reference internal stress level,

introducing a controlled amount of internal stress into said member, forming the said member into a desired configu-

ration, fixturing said member in the final desired configuration, the shape said member reverts to upon heating,



and heat treating said member to obtain the desired physical and mechanical properties.

4,881,982

METHOD FOR GASEOUS CARBURIZATION OF STEEL

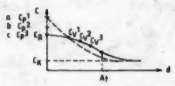
Bernd Edenhofer, Stuttgart, and Hans Pfau, Bedburg-Hau, both of Fed. Rep. of Germany, assignors to Ipsen Industries International Gesellschaft mit beschränkter Haftung, Kleve, Fed. Rep. of Germany

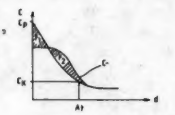
Filed Apr. 25, 1988, Ser. No. 185,862

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1987, 3714283

Int. Cl.[4] C23C *11/10*

U.S. Cl. 148—16.5 15 Claims





1. In a multi-step method for gaseous carburization of steel, where, in a carbon-rich gaseous atmosphere, an article that is to be carburized is, in a first carburization phase, exposed to a carbon charge that is as great as possible, at the carbon black limit, and, where a determination is made when to shift from the first carburization phase changing over in a subsequent diffusion phase, having a lower carbon charge that corresponds to the desired carbon content at the surface of the article is established, the improvement in combination therewith comprising the steps of:

regulating carburization in conformity with a first target value of carbon content at the surface, a second target value of depth of carburization, and at least one additional target value that is characteristic of the carbon content curve of said article, i.e. carbon distribution in said article graphically represented as carbon content plotted versus depth of carburization, with said regulating being executed in such a way that when said at least one additional target value is reached, automatically switching over to the subsequent diffusion phase wherein the carbon level that characterizes said carburization phase is reduced, and said diffusion phase is initiated.

4,881,983

MANUFACTURE OF CORROSION RESISTANT COMPONENTS

John D. Smith, Solihull, and Stephen E. Vanes, Hall Green, both of United Kingdom, assignors to Lucas Industries Public Limited Company, Birmingham, England

Filed Jul. 6, 1988, Ser. No. 215,563

Claims priority, application United Kingdom, Jul. 17, 1987, 8716928

Int. Cl.[4] C23C *8/34, 11/08*

U.S. Cl. 148—16.6 12 Claims

1. A method of manufacturing a steel component having corrosion resistance, and a uniform dense, deep black color, comprising the steps of sequentially: (a) forming an epsilon iron nitride or carbonitride surface layer on the component, (b) oxidising the component by a gaseous medium at a gas oxidation temperature to form an oxide layer about 0.2 to 1.0 micron thick and comprising substantially Fe_3O_4 whereby the component has a uniform dense, deep black color which comprises Fe_3O_4, and then (c) carrying out a surface finish treatment, without affecting the uniform dense, deep black color.

4,881,984

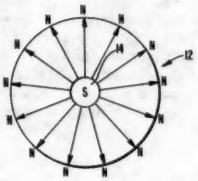
CONSOLIDATION OF MAGNET ALLOY POWDERS BY EXTRUSION AND PRODUCT THEREFROM

Vijay K. Chandhok, and Bao-Min Ma, both of Pittsburgh, Pa., assignors to Crucible Materials Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 889,760, Jul. 28, 1986, abandoned. This application Feb. 18, 1988, Ser. No. 159,455

Int. Cl.[4] H01F *1/02*

U.S. Cl. 148—101 2 Claims



1. A method for producing a fully dense, arcuate or cylindrical permanent magnet alloy article, said method comprising producing by gas atomization a particle charge of a permament magnet alloy composition comprising a rare earth element, iron and boron from which said article is to be made, in the absence of comminution and magnetic alignment of said particles placing said particle charge in a container, evacuating and sealing said container, heating said container and said particle charge to an elevated temperature and extruding said container and particle charge at a temperature of 1400° to 2000° F. to achieve mechanical anisotropic radial crystal alignment and corresponding anisotropic radial magnetic alignment and to compact said charge to full density to produce said fully dense article.

4,881,985

METHOD FOR PRODUCING ANISOTROPIC RE-FE-B TYPE MAGNETICALLY ALIGNED MATERIAL

Earl G. Brewer, Warren; Robert W. Lee, Troy, both of Mich., and John J. Croat, Noblesville, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 5, 1988, Ser. No. 228,435

Int. Cl.[4] H01F *1/02*

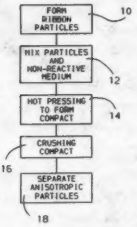
U.S. Cl. 148—103 14 Claims

1. A method of making magnetically anisotropic powder of a composition comprising iron, neodymium/praseodymium and boron, said powder either having appreciable coercivity as

processed or being heat treatable to acquire such coercivity, said method comprising:

preparing a molten mixture comprising a transition metal (TM) taken from the group consisting of iron and mixtures of iron and cobalt, one or more rare earth metals (RE) including neodymium and praseodymium, and boron, the proportions of such constituents being sufficient to form a product that upon crystallization consists essentially of the tetragonal crystalline compound having the empirical formula $RE_2TM_{14}B$;

rapidly solidifying such mixture to form magnetically isotropic particles of an amorphous material or of a very finely crystalline material containing said compound and



having small, generally spherical grains of an average size no greater than about 500 nm;

mixing the magnetically isotropic particles with a material that is substantially nonreactive with the isotropic particles and noncompressible at the temperature at which the particles are hot worked;

hot working the mixture of isotropic particles and nonreactive material to cause crystallites therein to be oriented along a crystallographically preferred magnetic axis to form anisotropic particles; and

separating the nonreactive material from the anisotropic particles to produce a resultant hot worked particle size and crystallographically oriented to be suitable for use in the manufacture of magnet products.

4,881,986

METHOD FOR PRODUCING A RARE EARTH METAL-IRON-BORON ANISOTROPIC SINTERED MAGNET FROM RAPIDLY-QUENCHED RARE EARTH METAL-IRON-BORON ALLOY RIBBON-LIKE FLAKES

Tadakuni Sato, and Yuichi Tachiya, both of Miyagi, Japan, assignors to Tokin Corporation, Miyagi, Japan

Filed Nov. 25, 1987, Ser. No. 138,250

Claims priority, application Japan, Nov. 26, 1986, 61-279645; Nov. 29, 1986, 61-285757; Jan. 23, 1987, 62-12590; Jan. 28, 1987, 62-16040; Mar. 24, 1987, 62-67943; Mar. 31, 1987, 62-79016; Jun. 30, 1987, 62-160966; Jul. 24, 1987, 62-183597; Jul. 25, 1987, 62-184698; Sep. 5, 1987, 62-221219; Sep. 7, 1987, 62-222109

Int. Cl.[4] B22F *3/12*

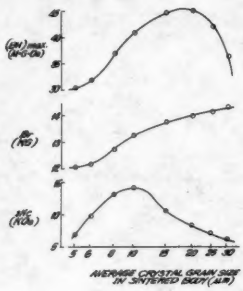
U.S. Cl. 148—103 **18 Claims**

1. In a method for producing a rare earth-transition metal-boron (R-T-B) anisotropic sintered magnet by preparing an R-T-B alloy powder containing $R_2T_{14}B$ crystal grains, subjecting the powder to a magnetic field, compacting the powder into a compact body of a desired shape, and inserting the compact body at a sintering temperature thereby to produce the sintered magnet, the improvement wherein said R-T-B alloy powder is a rapidly quenched alloy powder produced by:

preparing said R-T-B alloy in a molten state;

rapidly quenching said molten R-T-B alloy to form ribbons and/or ribbon-like flakes characterized by a main surface, each ribbon and/or flake having a predetermined thickness and containing said crystal grains uniformly dispersed in said ribbon and/or flake, said crystal grains having an average grain size less than said predetermined thickness and oriented in a direction parallel to the main surface of said ribbons or flakes; and

crushing and grinding said ribbons and/or flakes into a powder of an average particle size of a value less than said



predetermined thickness but larger than said average grain size, each particle of said powder containing said crystal grains extending in said parallel direction, to thereby enable said powder to be magnetically aligned in said magnetic field.

4,881,987

PROCESS FOR DIRECT SOFTENING HEAT TREATMENT OF ROLLED WIRE RODS

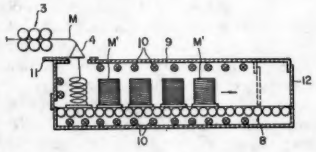
Susumu Kanbara; Kenji Aihara; Masato Tomiku; Yoshio Kawashima; Tadashi Sawada; Shinji Okuda, and Mitsuaki Ikeda, all of Kitakyusyu, Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan

Division of Ser. No. 207,905, Jun. 16, 1988, Pat. No. 4,834,345, which is a continuation of Ser. No. 133,295, Dec. 15, 1987, abandoned, which is a continuation of Ser. No. 47,600, May 11, 1987, abandoned, which is a continuation of Ser. No. 728,218, Apr. 29, 1985, abandoned. This application Jan. 11, 1989, Ser. No. 295,773

Claims priority, application Japan, May 1, 1984, 59-89114; Mar. 28, 1985, 60-65848; Mar. 28, 1985, 60-65849; Mar. 28, 1985, 60-46246; Mar. 28, 1985, 60-46247; Mar. 28, 1985, 60-46248; Mar. 28, 1985, 60-46249

Int. Cl.[4] C21D *9/52*; B21B *1/16, 9/00*

U.S. Cl. 148—12 B **19 Claims**



1. A process for the direct softening heat treatment of rolled steel wire rodsd having an Ar_1 transformation point, comprising:

rolling steel wire rods on a rolling line at a temperature above the Ar_1 transformation point,

directly receiving and coiling the rolled wire rods at an end of said rolling line while maintaining said rolled wire rods above the Ar_1 transformation point during said coiling, and

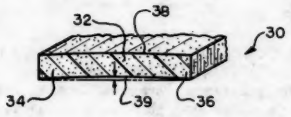
subjecting the coiled wire rods to the Ar_1 transformation subsequent to said coiling.

4,881,988

NOVEL FLEXIBLE MAGNET FOR USE IN SMALL DC MOTORS

John R. Bonser, Parkersburg, W. Va., assignor to RJF International Corporation, Akron, Ohio

Filed Nov. 16, 1987, Ser. No. 121,373
Int. Cl.[4] H01F *1/09*
U.S. Cl. 148—300 11 Claims



2. An extrudate for use as a flexible, tubular magnet comprising an extruded strip of flexible, magnetic material comprising a polymeric binder and magnetic particles;

said strip having a flexibility which enables said strip to be curled into a tubular, cylindrical form;

said strip extending from a first end to a second end and being adapted so that upon being curled into said tubular, cylindrical form said first and second ends are adjacent each other;

said strip having first and second arcuate surfaces extending from said first end to said second end, said first and second arcuate surfaces being parallel to each other so that said strip has a bowed profile and a substantially uniform thickness;

said first and second arcuate surfaces defining concave and convex surfaces, respectively, on the exterior of said strip;

said strip having a longitudinal central axis extending from said first end to said second end, each of said first and second arcuate surfaces being parallel to said longitudinal surface and having a consistent curvature relative to said longitudinal central axis over the entire length of said longitudinal central axis;

the width of said strip being constant over the entire length of said longitudinal central axis;

said first and second arcuate surfaces being oriented such that said first surface defines the inner surface and said second surface defines the outer surface of said tubular cylindrical form, upon said strip being curled into said form;

the flexibility of said strip and the curvature of said first and second arcuate surfaces being such that said first and second arcuate surfaces are flexible into parallel, substantially cylindrical orientations as said strip is being curled into said tubular, cylindrical form; so that said tubular, cylindrical form has parallel cylindrical inner and outer surfaces and a substantially uniform thickness; and

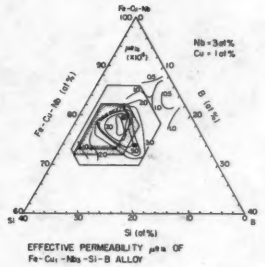
said strip upon being curled into said tubular cylindrical form and incorporated into a surrounding cylindrical motor shell of a permanent magnet motor producing a substantially uniform contact with the surrounding cylindrical motor shell and a relatively constant air gap with a rotor or stator disposed therein, thereby maximizing the magnetic flux available from said strip when incorporated into said permanent magnet motor.

4,881,989

FE-BASE SOFT MAGNETIC ALLOY AND METHOD OF PRODUCING SAME

Yoshihito Yoshizawa; Kiyotaka Yamauchi, and Shigeru Oguma, all of Kumagaya, Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan

Filed Oct. 1, 1987, Ser. No. 103,250
Claims priority, application Japan, Dec. 15, 1986, 61-297938; Mar. 13, 1987, 62-58577; Jun. 1, 1987, 62-137995
Int. Cl.[4] C22C *38/16*; H01F *1/02*
U.S. Cl. 148—302 27 Claims



16. An Fe-base soft magnetic alloy having the composition represented by the general formula:

$$(Fe_{1-a}M_a)_{100-x-y-z-\alpha-\beta-\gamma}Cu_xSi_yB_zM'_\alpha M''_\beta X_\gamma$$

wherein M is Co and/or Ni, M′ is at least one element selected from the group consisting of Nb, W, Ta, Zr, Hf, Ti and Mo, M″ is at least one element selected from the group consisting of V, Cr, Mn, Al, elements in the platinum group, Sc, Y, rare earth elements, Au, Zn, Sn and Re, X is at least one element selected from the group consisting of C, Ge, P, Ga, Sb, In, Be and As and a x, y, z, α, β and γ respectively satisfy $0 \leqq a \leqq 0.5$, $0.1 \leqq x \leqq 3$, $0 \leqq z \leqq 25$, $5 \leqq y+z \leqq 30$, $0.1 \leqq \alpha 30$, $\beta \leqq 10$ and $\gamma \leqq 10$, at least 50% of the alloy structure being fine crystalline particles having an average particle size of 1000 Å or less.

4,881,990

STEEL PRODUCT WITH GLOBULAR MANGANESE SULFIDE INCLUSIONS

Howard M. Pielet, Munster; Larry A. Frank, Crown Point, both of Ind.; William Edgar, Glenwood, Ill., and Milan Alavanja, Crown Point, Ind., assignors to Inland Steel Company, Chicago, Ill.

Continuation of Ser. No. 127,163, Nov. 27, 1987, abandoned, which is a division of Ser. No. 34,331, Apr. 3, 1987, Pat. No. 4,746,361. This application Oct. 24, 1988, Ser. No. 262,037
Int. Cl.[4] C22C *38/04*
U.S. Cl. 148—320 4 Claims

1. A free machining, deformed, solid steel product made from molten steel containing dissolved oxygen, said solid steel product comprising:

a microstructure including oxygen-containing, manganese sulfide inclusions;

said manganese sulfide inclusions having a relatively globular shape due to the presence of 60–150 mg/kg (ppm) dissolved oxygen in the molten steel from which said steel product was made;

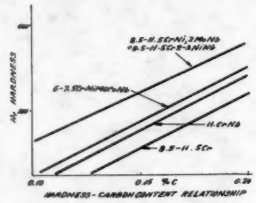
said inclusions having a composition devoid of any other elements for imparting globularity to the inclusions.

4,881,991

SPECIAL ROLLED STEELS

Thomas B. Beeton, 271 Cilliers Street, Muckleneuk, Pretoria, Transvaal; Roelof J. Mostert, Cormorant Circle 204, Wierda Park, Pretoria, Transvaal, both of South Africa; Emilia B. Navarro; Pierre R. Rosinger, both of 10 Rue Rose, 78990, Elancourt, France, and Rudolf P. Badenhorst, 80 van Wouw Street, Groenkloof, Pretoria 0181, Transvaal, South Africa

Continuation of Ser. No. 747,040, Jun. 20, 1985, abandoned.
This application Jun. 26, 1987, Ser. No. 67,614
Int. Cl.[4] C22C *38/44*
U.S. Cl. 148—325 16 Claims



1. A rolled steel product as herein defined which has substantially the following properties:

a hardness in the order of 500 HV (Vickers); a Charpy toughness value at 20° of 35 to 50 Joule; an excellent to fair corrosion resistance in simulated mild mine water as herein defined; and good to fair weldability; the steel having the following constitution on a percentage mass to mass basis:

C=0.13 to 0.19; Cr=8.5 to 12.0;
Ni=0 to 3.0; Si=0.10 to 0.5;
Mn=0.3 to 0.9; Mo=0 to 1.4;
Ti=0.01 to 0.04; Nb=0 to 0.06;
Al=0.02 to 0.06; P=0.035(max); and
S=0.02 (max); the balance being Fe.

4,881,992

ZIRCALOY 2 OR ZIRCALOY 4 STRIP HAVING SPECIFIED TENSILE AND ELASTIC PROPERTIES

Gerard Bunel, Rugles; Daniel Charquet, Albertville, and Max Dombre, Rugles, all of France, assignors to Compagnie Europeenne Du Zirconium Cezus, Courbevoie, France

Division of Ser. No. 50,569, May 18, 1987, Pat. No. 4,775,428.
This application Mar. 15, 1988, Ser. No. 168,451
Claims priority, application France, May 21, 1986, 86 07760
Int. Cl.[4] C22F *1/18*
U.S. Cl. 148—421 2 Claims

1. A strip of Zircaloy 2 or 4, with an oxygen content of between 900 and 1600 ppm and with mechanical characteristics of $E_{0.2}$ at 315° C.≧250 MPa, elongation in the longitudinal direction at 20° C.≧4%, and elongation in the transverse direction at 20° C.≧4%, said strip having a structure of elongated grains comprising recrystallized sub-grains in a cold-worked matrix, said sub-grains having a finer grain than the index ASTM '11' and representing 20 to 40% of the total volume.

4,881,993

EXPLOSIVE AND PROPELLANT COMPOSITION AND METHOD OF PREPARATION

Claude Fürbringer, Riehen, and Horst Pauling, Bottmingen, both of Switzerland, assignors to Hoffman-LA Roche Inc., Nutley, N.J.

Filed Jun. 29, 1989, Ser. No. 373,851
Claims priority, application Switzerland, Jun. 30, 1988, 2496/88
Int. Cl.[4] C06G *31/28*
U.S. Cl. 149—46 13 Claims

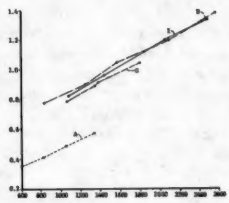
1. An explosive and propellant composition which comprises an admixture of 5,6-carbonyl-ascorbic acid or 5,6-carbonyl-erythorbic acid and a nitrate-containing oxidation agent.

4,881,994

IRON OXIDE CATALYST PROPELLANT, AND METHOD FOR MAKING SAME

Thomas P. Rudy, Saratoga; Forrest R. Goodson, and Mark E. Dudley, both of San Jose, all of Calif., assignors to United Technologies Corporation, Hartford, Conn.

Filed Apr. 30, 1987, Ser. No. 44,097
Int. Cl.[4] D03D *23/00*
U.S. Cl. 149—109.4 7 Claims



1. A method for making a ferric oxide burning rate enhancing catalyst particularly adapted for use in a rocket propellant comprising

(a) vaporizing an iron-containing compound at a temperature below about 500° C.; and

(b) combusting a mixture whereby ferric oxide particles are formed in suspension comprising

(i) said vaporized iron-containing compound; and

(ii) lower hydrocarbons, lower ethers or lower oxides of carbon;

whereby the product is a highly active finely divided burning rate catalyst.

4,881,995

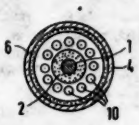
METHOD AND ASSEMBLY KIT FOR FORMING DEFINED LONGITUDINALLY WATERTIGHT SECTIONS IN WIRINGS COMPRISING A PLURALITY OF INDIVIDUAL STRANDS AND/OR CABLE STRANDS

Helmut Arenz, Alfter-Impekoven, Fed. Rep. of Germany, assignor to DSG Schrumpfschlauch GmbH, Meckenheim, Fed. Rep. of Germany

Filed Sep. 3, 1987, Ser. No. 92,454
Claims priority, application Fed. Rep. of Germany, Sep. 18, 1986, 3631769
Int. Cl.[4] H01B *13/06*
U.S. Cl. 156—52 24 Claims

1. A method for forming a defined longitudinally watertight section in a wiring system comprised of a plurality of individual strands, characterized by embedding at least one extruded plastic element formed of a thermoplastic melt adhesive between the individual strands of the wiring system, with the thermoplastic melt adhesive melting to a molten flowable state and swelling to an enlarged cross-sectional shape in response to being heated, and mounting a radially prestretched heat-

shrinkable component around the outer periphery of said wiring system at the location of said section to be sealed, and subjecting the section to be sealed to a heat treatment for



activating said thermoplastic melt adhesive to a molten flowable state and also swelling to an enlarged cross sectional shape, and also causing said heat-shrinkable component to shrink tightly about said wiring system.

4,881,996

SPLICE ADHESIVE FOR EDPM ROOFING AND SPLICING METHOD EMPLOYING SAME

Stephanie Nussbaum, Orrville, and Roger L. Streets, Ashland, both of Ohio, assignors to Ashland Oil, Inc., Russell, Ky.

Filed Feb. 22, 1988, Ser. No. 158,416
Int. Cl.[4] B31F *5/00*; C09J *5/00*
U.S. Cl. 156—157 8 Claims

5. A method of splicing unprimed, cured elastomeric substrates together comprising the steps of:

(I) applying to said elastomeric substrates an adhesive coating composition comprising:

(a) halogenated pre-crosslinked isobutylene-isoprene copolymer butyl rubber,

(b) thermoplastic copolymer selected from the group consisting of styrene-butadiene-styrene, styrene-isoprene-styrene, styrene-ethylene-butylene-styrene, and styrene-ethylene-propylene-styrene polymers

(c) a hydrocarbon resin selected from the group consisting of thermoplastic hydrocarbon resin, terpene phenol polymer resin and polymerized pentaerythritol rosin ester,

(d) quinoid cure mixture comprising a metal catalyst complex oxidizing agent and a quinoid crosslinking agent, and

(e) solvent, said adhesive composition being storage stable in a closed container for at least six months,

(II) drying said coated substrates, and

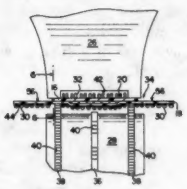
(III) joining said dried coated substrates.

4,881,997

METHOD FOR ADAPTING SEPARABLE FASTENERS FOR ATTACHMENT TO OTHER OBJECTS

Richard N. Hatch, Hooksett, N.H., assignor to Velcro Industries. B.V., Amsterdam, Netherlands

Division of Ser. No. 129,883, Nov. 25, 1987, which is a continuation of Ser. No. 756,005, Jul. 17, 1985, abandoned. This application Jan. 24, 1989, Ser. No. 301,503
Int. Cl.[4] A44B *21/00*
U.S. Cl. 156—66 17 Claims



1. A method of adapting a separable fastener member of the hook and loop-type for attachment to an object which comprises:

(a) taking a separable fastener member having a plurality of hook-type or loop-type engaging elements upstanding from one surface; and,

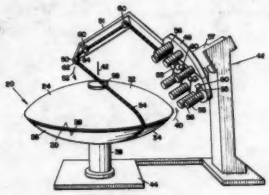
(b) attaching said separable fastener member to a second member positioned in back to back relation with the surface of said fastener member opposite the surface having said engaging elements, said second member having a plurality of elements upstanding from the opposite surface, which elements are capable of being surrounded and encapsulated by a material forming at least a part of the object.

4,881,998

RADIATION GATHERING REFLECTOR AND METHOD OF MANUFACTURE

Dean C. Youngkeit, Willard, Utah, assignor to Morton Thiokol, Inc., Chicago, Ill.

Filed Jan. 23, 1987, Ser. No. 6,518
Int. Cl.[4] B65H *81/00*
U.S. Cl. 156—173 14 Claims



8. A method of making a radiation gathering reflector comprises:

a. providing a mandrel which has a pair of equatorially engaging opposing surfaces of revolution each of which has a shape corresponding to a predetermined shape of the reflector surface;

b. forming a reflective surface on the pair of opposing surfaces of revolution on the mandrel;

c. polar winding matrix impregnated fibrous material about the reflective surface and allowing the matrix to harden to form a composite of matrix impregnated fibrous material with the reflective surface bonded to the composite to form two integrally connected radiation gathering reflectors corresponding to the pair of opposing surfaces of revolution respectively whereby the thickness of each support member is smallest at the equator and uniformly increases as the distance from the equator increases; and

d. forming an equatorial cut through the composite and reflective surface after the matrix has hardened to separate the radiation gathering reflectors from each other and from the mandrel.

4,881,999

PROCESS FOR THE PREPARATION OF DECORATIVE SURFACE COVERINGS WITH DOT PATTERNS

Richard H. Balmer, Manheim, and Barbara A. Pfeiffer-Meshaw, Gordonville, both of Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.

Division of Ser. No. 139,768, Dec. 30, 1987, Pat. No. 4,797,315, which is a continuation-in-part of Ser. No. 59,518, Jun. 8, 1987, abandoned. This application Aug. 11, 1988, Ser. No. 231,058
Int. Cl.[4] B29B *1/17*; B32B *31/00*; B05D *5/06*
U.S. Cl. 156—231 1 Claim

1. A method for preparation of a surface covering product, which method comprises:

(a) providing a release carrier as an impervious coating;

(b) applying raised elements with a screen printer onto said release carrier, said raised elements, which comprise a thixotropic plastic, being spaced apart to provide de-

pressed areas therebetween and said raised elements being from 0.015 to 0.045 inches in height and having a geometric shape where the raised elements engage the release carrier;

(c) filling in the depressed areas between the raised elements and area above the raised elements with a granular material;

(d) placing a substrate above the raised elements and in contact with the granular material;

(e) fusing together the raised elements, the granular material and the substrate; and

(f) removing the release carrier, to form a surface covering product with the substrate being a base of the product and a surface contacted by the release carrier being the decorative surface of the product.

4,882,000

METHOD OF MANUFACTURING PRINTED CIRCUIT BOARDS

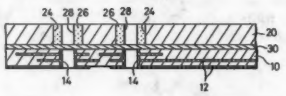
Risuke Ozaki, Kokubunji, Japan, assignor to O. Key Printed Wiring Co., Ltc., Tokyo, Japan

Continuation of Ser. No. 866,352, May 23, 1986, abandoned. This application Apr. 1, 1988, Ser. No. 177,896

Claims priority, application Japan, May 23, 1985, 60-109308; May 23, 1985, 60-109309

Int. Cl.[4] B44C *1/16;* **B32B** *31/00;* **B21D** *1/00*

U.S. Cl. 156—239 **1 Claim**



1. A method of manufacturing printed circuit boards which comprises the steps of: preparing a metal board material having holes filled with resin provided therein,

attaching an adhesive sheet and a release paper to said metal board material by means of a prepreg,

providing lead wire holes at centers of said resin filled said holes, forming a metal board from said metal board material, finishing its outer configuration, detaching said release paper from said metal board, and properly positioning said metal board relative to a resin board having at least one circuit layer and at least either of through holes or lead wire holes, and fastening said metal board and said resin board together by means of said adhesive sheet by pressing without any heat being provided.

4,882,001

PHOTOINITIATOR CROSSLINKABLE MONOMER COMPOSITIONS AS ADHESIVES AND METHOD OF USING

RenéA. A. González, Duessledorf; Heinz-Christian Nicolaisen, and Lothar Kammer, both of Hanover, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Jul. 27, 1988, Ser. No. 225,323

Claims priority, application Fed. Rep. of Germany, Jul. 27, 1987, 3724838

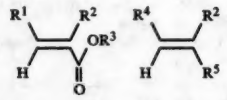
Int. Cl.[4] C09J *3/00, 5/00*

U.S. Cl. 156—273.3 **8 Claims**

1. A method for bonding metal surfaces together comprising the steps of

I. coating one or both surfaces with an adhesive composition which consists of

A. from about 30 to about 90 parts by weight of at least one liquid polymerizable monomer of the formula



(I) (II)

wherein R^1 and R^2 independently of one another are hydrogen or a methyl group, R^3 is a C_1–C_8 linear or branched chain alkyl radical, or a C_1–C_8 linear or branched chain alkyl group substituted by at least one hydroxy or amino group, R^4 and R^5 independently of one another are hydrogen, an alkylenecarboxy group containing 0 to 4 carbon atoms in the alkylene radical or an ester thereof with an R^3 group, an aryl radical, or an aryl radical substituted by at least one C_2–C_4 hydrocarbon group containing a double bond, with the proviso that R^4 and R^5 are not both hydrogen;

B. from about 0.01 to about 2 parts by weight of camphor quinone;

C. from about 0.01 to about 5 parts by weight of an aryl sulfinate;

D. from about 5 to about 60 parts by weight of a thickener which is polymethyl methacrylate, highly disperse silica, or a mixture of the foregoing;

E. from 0 to about 10 parts by weight of an adhesion promoter which is methacrylic acid, acrylic acid, hydroxyethyl (meth) acrylate, or a mixture of two or more of the foregoing; and

F. from 0 to about 5 parts by weight of an accelerator which is at least one of 4-dimethylaminobenzoic acid, 4-dimethylaminobenzoic acid ethyl ester, 4-dimethylaminobenzaldehyde, 2-mercaptobenzthiazole, 2-mercaptobenzoxazole, 2-mercaptobenzimidazole, p-tolylaldehyde, terephthaldehyde, and lauric aldehyde,

II. exposing the coated surfaces for from about 1 to about 30 minutes to daylight or to an artificial visible light source to initiate the polymerization of the adhesive composition,

III. joining the surfaces exposed to said daylight or to said artificial visible light source together, and

IV. subjecting the joined surfaces to a pressure of from about 1 to about 200 MPa for a period of from about 2 to about 24 hours.

4,882,002

PROCESS OF MANUFACTURING A COMPOSITE PANEL FOR SHOCK ABSORPTION

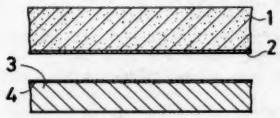
Yoshio Ando, Kawagoe; Yoshiki Ishige, Tokorozawa; Toshiyuki Kinugasa, Hidaka, and Shoji Sato, Tokorozawa, all of Japan, assignors to Honda Giken Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 13, 1988, Ser. No. 208,091

Claims priority, application Japan, Jun. 29, 1978, 53-78021; Jun. 29, 1978, 53-78022; Jun. 29, 1978, 53-78023

Int. Cl.[4] B32B *7/00*

U.S. Cl. 156—310 1 Claim



1. A process of manufacturing a composite panel capable of shock absorption, said process comprising subjecting a surface of a polyolefin foam member to a primer treatment in which a polyester hot-melting bonding agent with an added isocyanate cross-linking agent is applied to said surface and is hardened by cross-linking thereof to form a primer treatment surface having no hot-melting adhesive properties, applying to one surface of a laminating member a cross-linking type hot-melting bonding agent, placing the treated surfaces of the foam member and laminating member in contact with one another, and bonding the two members together while treating and applying pressure thereto.

4,882,003

SEALANT PRIMER COMPOSITION AND METHOD

Brian J. Bugg, Wixom; Glenn E. Martin, Farmington Hills; David J. Oberg, Birmingham, and Adriana E. Ticu, Detroit, all of Mich., assignors to BASF Corporation, Clifton, N.J.

Filed Jul. 19, 1988, Ser. No. 221,075

Int. Cl.[4] C09J *5/04*

U.S. Cl. 156—315 9 Claims

1. In a process for bonding a non-porous material to an enamel-coated substrate comprising the steps of:

1) applying a bead of polymeric sealant material to said enamel-coated substrate; and

2) contacting said non-porous material to said bead of polymeric material;

the improvement comprising:

3) prior to applying said bead of polymeric sealant material to said enamel-coated substrate, first applying to said enamel-coated substrate a sealant primer composition comprising:

a) from about 35 weight percent to about 55 weight percent of a sealant primer polymer base composition comprising the reaction product of

1) from about 2 weight percent to about 10 weight percent of 2-sulfoethyl methacrylate;

2) from about 35 weight percent to about 45 weight percent of methyl methacrylate;

3) from about 35 weight percent to about 45 weight percent butyl methacrylate; and

4) from about 10 weight percent to about 20 weight percent iso-butyl methacrylate;

b) from about 1 weight percent to about 10 weight percent of a pigment dispersion;

c) the balance comprising a solvent effective to interpenetrate the the substrate enamel coating selected from the group consisting of

i) chlorinated saturated hydrocarbons of from two to three carbon atoms;

ii) saturated alkanols of from one to six carbon atoms;

iii) saturated dialkyl ketones of from three to six carbon atoms;

iv) alkyklated benzene hydrocarbons of from seven to ten carbon atoms, and mixtures thereof.

4,882,004

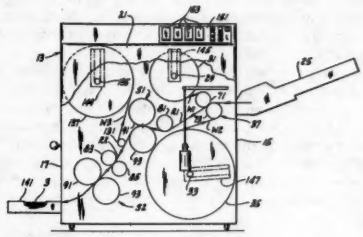
COMPACT TABLETOP MACHINE FOR MAKING LABELS AND OTHER LAMINATIONS

Douglas M. Watson, 3684 Forest Park Blvd., St. Louis, Mo. 63108

Filed Dec. 24, 1987, Ser. No. 137,770

Int. Cl.[4] B32B *31/12*

U.S. Cl. 156—381 1 Claim



1. A tabletop machine for making laminations such as labels of the type comprising a central substrate layer and first and second outer layers having inside glue-bearing faces in face-to-face contact with opposite faces of the central layer, said machine comprising:

a housing having a front, a back and opposite side walls;

means for feeding individual sheets of printable substrate material about 8½ in. wide by about 11 in. long one after another for travel along a path extending generally in front-to-rear direction through the housing with the leading edge of one sheet closely adjacent the trailing edge of the sheet in front of it;

control means on the housing manually operable for controlling operation of the machine;

first roller means in the housing for mounting a first supply roll of web material corresponding to said first outer layer for rotation about an axis extending side-to-side with respect to the housing;

second roller means in the housing for mounting a second supply roll of web material corresponding to said second outer layer for rotation about an axis extending side-to-side with respect to the housing;

means in the housing for combining said sheets and said web materials as the sheets are fed forwardly and as the web materials are pulled from respective first and second supply rolls to form a laminated strip, said combining means being operable to press inside glue-bearing faces of web material pulled from said first and second supply rolls against opposite faces of each sheet of substrate material to form said outer layers;

die cutting means in the housing downstream from said combining means for cutting through said outer layers of the laminated strip to form individual labels or the like, said die cutting means comprising a first die cutting station and a second die cutting station downstream from the first station;

the length of said path through the housing from immediately upstream of said combining means to immediately downstream from said second die station being not substantially more than the combined lengths of two sheets, and the distance between the front and rear walls of the housing being less than about two feet for enabling placement and operation of the machine on a tabletop;

said first die cutting station comprising a die roll and an anvil

roll, a pair of bearing mounting respective ends of said die and anvil rolls for rotation, and quick-release means for rapid mounting and demounting of the bearings from the housing;

said quick-release means comprising a quick-release assembly on each side wall of the housing, said quick-release assembly comprising means guiding a respective pair of bearings for movement relative to one another to vary the radial distance between said die and anvil rolls, stop means at one end of said guide means engageable by one bearing of the pair to limit movement of the bearing in one direction in said guide means, spring means urging the other bearing of the pair in the opposite direction away from said one bearing, and pusher means at the opposite end of said guide means movable between an operative position for pushing said other bearing against the urging of said spring means toward said one bearing and a release position enabling said bearings to be removed from said guide means;

said pusher means comprising a pivot bar about an axis extending in side-to-side direction with respect to the housing from said release position to said operative position in which the bar assumes a generally horizontal position above said other bearing, and a screw member on said pivot bar threadable into pressure engagement with said other bearing, said pivot bar being pivotable on its axis up away from said operative position toward said release position; and

a hold-down bar pivotable about an axis extending in side-to-side direction with respect to the housing from a generally upright position in which it is engageable with the outer free end of said pivot bar to hold it in said operative position toward an angled position in which it disengages the pivot bar for enabling the latter to pivot to its release position.

4,882,005

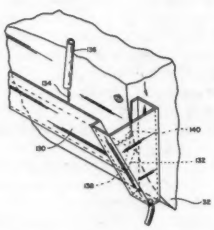
DEVICE FOR MAKING LAMINATED ARCH CORRUGATED STRUCTURES

Frederick H. Thompson, Marion, Ill., assignor to Thompson Corrugated Systems, Inc., Marion, Ill.

Continuation-in-part of Ser. No. 864,591, May 16, 1986, abandoned. This application Aug. 10, 1987, Ser. No. 85,274

Int. Cl.[4] B32B *31/12*

U.S. Cl. 156—470 **19 Claims**



1. Apparatus for making corrugated panel structures having a laminated corrugated web formed by at least two connected together web members having peaks and valleys, and a facer member attached to the corrugation peaks on one side thereof, comprising:

a supply of separate web materials to be laminated and corrugated to form a corrugation medium and a supply of a web facer member to be attached to the corrugation peaks on one side of the corrugation medium;

a first applicator roller having a cylindrical surface formed by a plurality of spaced surface depressions distributed uniformly thereover, means to apply an adhesive substance in liquid from when applied to the surface of the first applicator roller including a container positioned adjacent to one side of the first applicator roller in position to directly expose a portion of the cylindrical surface thereof to the adhesive substance in the container whereby adhesive is transferred from the container to the first applicator roller to cover the cylindrical surface and fill the uniformly distributed surface depressions therein;

means to rotate the applicator roller;

said container being closed at both ends and along both sides and including means to limit the depth of adhesive that can be in said container so that the area of the applicator roller that is exposed to the adhesive in the container remains substantially constant and so that an excess of adhesive can be fed into the container without substantial change in the adhesive depth therein;

means forming a scraping edge on said container biased into engagement with and in opposition to the direction of rotation of the cylindrical surface of the applicator roller to positively bear against said surface substantially uniformly along the length thereof during rotation thereof to positively and uniformly scrape said surface and remove therefrom excessive adhesive substance except for the adhesive substance contained in the surface depressions, which scraped and removed adhesive remains in said container;

means to maintain a portion of one of the web members to form the corrugation medium engaged with the cylindrical surface of said applicator roller over a predetermined arcuate portion thereof and for a time period sufficient to permit transfer of the adhesive substance remaining in the depressions while in liquid form to the one web member;

means to bring the separate web members together with the adhesive substance therebetween to form a laminated medium therefrom;

means including a pair of cooperatively engaged corrugating rollers forming a corrugation nip therebetween;

means for feeding the laminated medium before the adhesive is fully cured into the nip between the corrugating rollers to corrugate the medium and form peaks and valleys therein;

means including a second applicator roller positioned adjacent to one of the corrugating rollers for applying an adhesive substance to the corrugation ridges on one side of the corrugated medium;

a pressure roller positioned adjacent to said one corrugating roller to form a nip therewith;

means to bring the web facer member into contact with the corrugation peaks of the corrugated medium to unite the facer material and the corrugated medium to form a single face corrugated member.

4,882,006

SYSTEM FOR STRETCHING AND SEVERING STRIP-LIKE RESIN SHEET

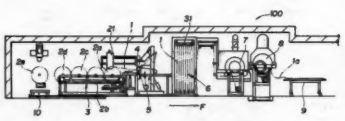
Shingo Seki, Osaka, Japan, assignor to Nippon Sheet Glass Co., Ltd., Japan

Filed Dec. 17, 1987, Ser. No. 134,291

Claims priority, application Japan, Dec. 23, 1986, 61-202222[U]; Dec. 23, 1986, 61-202223[U]

Int. Cl.[4] B29C *43/24*

U.S. Cl. 156—504 **8 Claims**



1. An apparatus for stretching and severing a strip-like resin sheet unwound from a sheet roll in a first direction to produce a product of a prescribed shape, said apparatus comprising:

a support base movable in a second direction transverse to said first direction;

a stretching device mounted on said support base and having forming members for stretching said strip-like resin sheet into a fan-shaped resin sheet;

a severing device including cutting edges, the severing device mounted on said support base downstream of said stretching device in said first direction for severing said fan-shaped resin sheet on the cutting edges into said product, said severing device being angularly movable for aligning said cutting edges with a radial direction of said fan-shaped resin sheet in response to movement of said support base in said second direction; and

a rotatable feeding device mounted on said support base downstream of said severing device in said first direction for feeding said product to a prescribed area, said feeding device having an extensible and contractible arm supporting a chuck for gripping the leading end of said fan-shaped resin sheet.

4,882,007

ROBOT SYSTEM FOR FORMING A STRUCTURAL COMPONENT OF A PREIMPREGANTED FIBER REINFORCED TAPE

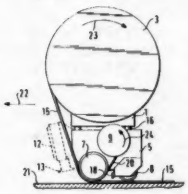
Wilhelm Lengen, Rosengarten; Rudolf Oberfranz, Buchholz, and Wolfgang Puritz, Buxtehude, all of Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 43,083, Apr. 27, 1987, abandoned. This application Jun. 8, 1988, Ser. No. 204,995

Claims priority, application Fed. Rep. of Germany, Apr. 28, 1986, 3614365

Int. Cl.[4] B31D *1/00*

U.S. Cl. 156—523 **5 Claims**



1. A robot system for dispensing and laminating a preimpregnated tape onto a structural component, comprising a robot having a cantilevered arm with a free end and tiltable about a plurality of axes, carrier frame means **(1)** for carrying a tape supply roller, a work performing unit **(5, 51)** connected to said carrier frame means, adapter means **(2, 54)** connected to said carrier frame means for securing said work performing unit as an attachment to said free end of said arm of said robot, said work performing unit comprising feed roller means for advancing said tape, cutting means for cutting off portions of said tape, support means for supporting said feed roller means and said cutting means to form said work performing unit, said system further including guiding mounting means for mounting said support means relative to said carrier frame means in a support movement guiding manner, elastically yielding biasing means operatively interposed between said guiding mounting means and said support means for elastically opposing any movement of said work performing unit **(5)** toward said carrier frame means **(1)**, whereby said biasing means maintain a defined spacing between the work performing unit **(5, 51)** and said carrier frame means **(1)**, so that a contact pressure of said feed roller means on said tape is adjustably determined through said biasing means in response to a respective movement of said arm of said robot system, and control signal responsive drive means arranged for operating said robot system in response to a control program, and wherein said cutting means comprise a tiltably mounted knife carrier and a rotatable knife disk mounted to said knife carrier, said control signal responsive drive means comprising a tilting drive member connected to said knife carrier for tilting the knife carrier from a rest position into a working position and vice versa, whereby said knife disk is moved in a direction extending across a direction defined by said tape, said cutting means further comprising knife counter means arranged for cooperation with said knife disk when said knife disk is in said working position.

4,882,008

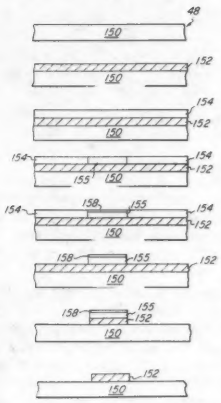
DRY DEVELOPMENT OF PHOTORESIST

Cesar M. Garza, Plano; Monte A. Douglas, Coppell; Lee M. Loewenstein, Plano, and Cecil J. Davis, Greenville, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jul. 8, 1988, Ser. No. 216,884

Int. Cl.[4] B44C *1/22;* **H01L** *21/306;* **C03C** *15/00;* **B29C** *37/00*

U.S. Cl. 156—643 **29 Claims**



1. A process for developing a photolithographic pattern on the surface of a workpiece in a process chamber;

(a) disposing the workpiece in a process chamber;

(b) heating the workpiece and introducing a silylating agent to the process chamber and to a face of the workpiece to be processed;

(c) generating activated species froma source of oxygen; and

(d) introducing the activated species to the face of the workpiece.

4,882,009

APPARATUS FOR CONCENTRATING BRINE WATERS OR DEWATERING BRINES GENERATED IN WELL DRILLING OPERATION

Joseph J. Santoleri, Berwyn, Pa., and Richard D. Ross, Moorestown, N.J., assignors to Four Nines, Inc., Plymouth Meeting, Pa.

Filed Jul. 13, 1987, Ser. No. 72,518

Int. Cl.[4] B01D *1/18, 1/14*

U.S. Cl. 159—4.2 **6 Claims**

1. A brine concentrator for concentrating dilute brine solution comprising:

means for providing a first source of heated water;

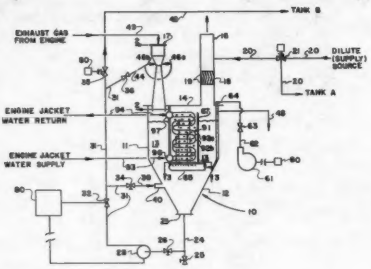
means for providing a second source of exhaust gases;

a concentrator tank having an inlet opening located at a top end for receiving dilute brine solution and an outlet opening located at a bottom end for discharging concentrated brine solution;

first concentration means interposed within said tank for receiving said heated water from said first source in order to provide a transfer of heat from said heated water to said dilute brine solution in said first concentration means;

air pressure means located within said tank below said first concentration means for generating air bubbles within said first concentration means in order to facilitate the transfer of heat from said heated water to said dilute brine solution within said first concentration means;

a recirculation conduit located below said air pressure means and connected to said outlet opening of said tank for permitting said concentrated brine solution to be recycled back into said tank;



second concentration means attached at said top end of the tank for receiving exhaust gases from said second source and concentrated brine solution recirculated from said outlet opening of said tank to provide a transfer of heat from said exhaust gases to said concentrated brine solution; and

venting means also attached at said top end of the tank to provide a passageway through which said exhaust gases from said second concentration means exit said tank, wherein said venting means comprises a stack having one end affixed to said top end of said tank and a second end open to the atmosphere; and means for introducing dilute brine solution into said inlet opening of said tank through said stack.

4,882,010

METHOD FOR BURNING EVAPORATED WASTE LIQUOR

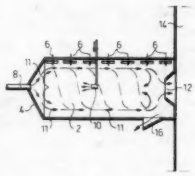
Tom O. M. Roos, Grankulla, Finland, assignor to Stiftelsen Cellulosa-Och Pappersforskning, Sweden

Continuation of Ser. No. 918,947, Sep. 22, 1986, abandoned. This application Jan. 15, 1988, Ser. No. 145,693

Claims priority, application Sweden, Jan. 22, 1985, 8500281

Int. Cl.[4] D21C *11/12, 11/14;* F23L *1/00;* F23G *7/04*

U.S. Cl. 162—30.1 **1 Claim**



1. A method for recovering sodium carbonate and sodium sulphide values from waste liquor produced by sodium-based pulp production processes, said method consisting essentially of:

(a) feeding fuel and combustion air to a cylindrical reaction chamber having a conical first end wall and a second end wall at the end of the reaction chamber and a cylindrical wall therebetween, to heat said reaction chamber to a temperature sufficient to effect drying and pyrolysis of said waste liquor; and

(b) once said temperature is achieved, performing the following without feeding further fuel:

(i) feeding air to said reaction chamber through air inlets located along said cylindrical wall arranged along the entire length thereof to provide substantially tangential flow;

(ii) injecting said waste liquor into said reaction chamber through a nozzle located in the interior thereof, directed toward said first end wall where the fuel and air are fed to the reaction chamber, yet spaced apart therefrom; and

(iii) withdrawing product gases from a first outlet port at the center of said second end wall, and product solids from a second outlet port in the vicinity of said second end wall;

such that at least a portion of the gases in said reaction chamber flow in a circulating path extending sustantially the full length of said reaction chamber, said circulating path comprising air and fuel traveling along the conical first end wall toward said cylindrical wall wherein said portion of the gases flow in a spiral path along said cylindrical wall flowing from said first end wall to said second end wall, and an axial portion along the axis of said reaction chamber flowing from said second end wall to said first end wall; and such that said injected waste liquor is mixed with and sufficiently heated by said gases in said circulating path to maintain stable reaction conditions sufficient for substantially complete pyrolysis of said waste liquor without added fuel.

4,882,011

DEVICE FOR GENERATING NEGATIVE PRESSURE INSIDE A MANTLE OF A REVOLVING ROLL

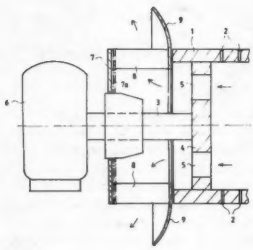
Pekka Eskelinen, Karhula; Vesa Vuorinen, Turku, and Seppo Rantanen, Merimasku, all of Finland, assignors to Valmet Paper Machinery Inc., Finland

Filed Oct. 27, 1988, Ser. No. 263,640

Claims priority, application Finland, Oct. 29, 1987, 874774

Int. Cl.[4] D21F *3/10*

U.S. Cl. 162—368 **12 Claims**



1. Device for generating negative pressure inside a substantially cylindrical mantle of a revolving roll, comprising the combination of

through-holes, grooves, or equivalent apertures being provided in the roll mantle,

means defining a suction chamber within an interior of the roll in which a negative pressure can be generated by suctioning air out of the suction chamber,

with a suction flow being directed towards the suction chamber prevailing in the holes, grooves or equivalent apertures of the roll mantle,

at least one blower rotor attached to the roll and rotatable along with the roll,

an intake side of said rotor connected to or communicating with the suction chamber of the roll,

said blower rotor and roll being constructed and arranged

such that rotary movement of the roll generates rotary movement of said rotor which generates the negative pressure in the suction chamber, and

openings provided in at least one end of the roll through which said rotor is arranged to suction air out of the suction chamber of the roll.

4,882,012

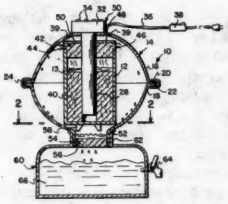
WATER DISTILLER

Kurt Wasserman, P.O. Box 77, Port Jervis, N.Y. 12771

Filed Dec. 10, 1987, Ser. No. 130,947

Int. Cl.[4] B01D *3/00*

U.S. Cl. 202—176 **23 Claims**



1. Apparatus for distilling water comprising:

(a) a dome means for condensing water vapor on its interior surface;

(b) an inner cylindrical vessel under the center of said dome means for containing said water, said vessel having an opening at its upper end;

(c) heating means for boiling said water in said vessel to thereby drive water vapor to the opening of said vessel;

(d) means at the opening of said vessel for directing the water vapor radially of said vessel and toward the interior surface of said dome means, wherein said means comprises a cylindrical filtration means for removing particulates from said water vapor including a cylindrical sidewall upstanding from the opening of said vessel and means for sealing the top of said filtration means for directing outflow of water vapor through said cylindrical sidewall; and

(e) means under said vessel for catching a condensate which runs off the interior surface of said dome means.

18. Apparatus for distilling water comprising:

(a) dome means for condensing water vapor on its interior surface;

(b) a vessel under said dome means for containing said water;

(c) a passage means for permitting removal of the water vapor from said vessel;

(d) heating means for boiling said water in said vessel to thereby drive water vapor from said vessel via said passage means toward the interior surface of said dome means; and

(e) mans under said vessel for catching a condensate which runs off the dome means, said condensate catching means comprising a downwardly converging member below said vessel and supporting said vessel and supporting said dome means, for directing the condensate caught to the center of said member.

4,882,013

APPLICATION OF TETRATHIAFULVALENES IN BIOELECTROCHEMICAL PROCESSES

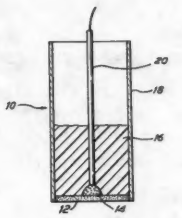
Anthony P. F. Turner; Stuart P. Hendry, and Marco F. Cardosi, all of Cranfield, England, assignors to Cranfield Institute of Technology, Cranfield, England

Filed Feb. 24, 1987, Ser. No. 18,046

Claims priority, application United Kingdom, Feb. 27, 1986, 8604830; Dec. 2, 1986, 8628721

Int. Cl.[4] G01N *27/46*

U.S. Cl. 204—1 T **14 Claims**



1. A bioelectrochemical system comprising:

a biological system comprising a redox system which requires electron transfer for its operation, wherein said redox system comprises an enzyme;

an electrode; and

a mediator for transferring electrons between said electrode and the enzyme of said redox system for operation of said redox system, characterized in that said mediator is tetrathiafulvalene, and is not complexed with an electron acceptor molecule.

4,882,014

ELECTROCHEMICAL SYNTHESIS OF CERAMIC FILMS AND POWDERS

R. Tom Coyle, Yorba Linda, Calif., and Jay A. Switzer, Pittsburgh, Pa., assignors to Union Oil Company of California, Los Angeles, Calif.

Filed Feb. 24, 1988, Ser. No. 159,759

Int. Cl.[4] C25B *1/00*

U.S. Cl. 204—1.5 **16 Claims**

7. A method for producing a ceramic precursor composition, said method comprising the following steps: (1) electrochemically generating acid or base materials at an anode or at a cathode respectively, of a biased electrochemical cell containing an anode compartment separated from a cathode compartment, said acid or base materials reacting with starting materials contained in said compartments to produce an electrodesposited ceramic precursor composition and (2) said electrochemically deposited ceramic precursor composition obtained in step (1) is dispersed and dried.

16. A method for producing a ceramic precursor composition, said method comprising the following steps: (1) electrochemically depositing a ceramic precursor composition in a cathode compartment of a biased electrochemical cell which contains an anode and anode compartment separated from a cathode and cathode compartment, said electrochemical cell generating a base material at the cathode in the cathode compartment and said ceramic precursor composition containing a metal oxide or metal hydroxide, (2) said electrochemically deposited ceramic precursor composition obtained in step (1) is dispersed and dried, and (3) said dispersed and dried ceramic precursor composition obtained in step (2) is compressed to a green body and sintered to produce a ceramic composition containing a metal oxide.

4,882,015

METHOD FOR MANUFACTURING A PERFORATED BODY, FRICTION SPINNING MEANS USING THE PERFORATED BODY AND A FRICTION SPINNING DEVICE USING THE FRICTION SPINNING MEANS

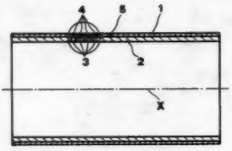
Werner Oeggerli, Winterthur, Switzerland, assignor to Rieter Machine Works Ltd., Winterthur, Switzerland

Filed Nov. 9, 1987, Ser. No. 117,841

Claims priority, application Switzerland, Nov. 13, 1986, 4543/86

Int. Cl.[4] C25D *1/08*

U.S. Cl. 204—11 14 Claims



1. A method for the production of a perforated body for receiving textile fibers deposited on a fiber receiving surface of the perforated body by means of an airstream and containing perforations through which the airstream is passed and which widen in the direction of flow of the airstream, comprising the steps of:

providing a mold for the formation of the perforated body and containing inset electrical insulator fillings in holes at a predetermined number of locations corresponding to the locations of the perforations in the perforated body to be formed; and

electroforming on the mold of a perforated body containing perforations which widen in the direction of flow of the airstream.

4,882,016

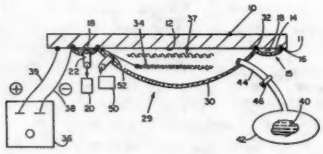
IN-SITU SURFACE TREATMENT CONTAINMENT APPARATUS AND METHOD

Everett A. Westerman Jr., Auburn, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed May 2, 1988, Ser. No. 189,423

Int. Cl.[4] C25D *5/02*

U.S. Cl. 204—15 14 Claims



1. The method of providing a containment for treating a surface in-situ, comprising:

attaching a moldable, sealing material to said surface;

attaching a treating membrane to said moldable sealing material to form a treating chamber, said treating chamber including a conductive screen and an insulating member disposed between said conductive screen and said surface;

creating a vacuum within said treating chamber; and

providing a fluid within said treating chamber, said vacuum causing said fluid to be distributed between said conductive screen and said surface.

4,882,017

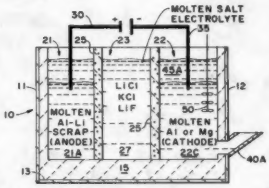
METHOD AND APPARATUS FOR MAKING LIGHT METAL-ALKALI METAL MASTER ALLOY USING ALKALI METAL-CONTAINING SCRAP

Mark L. Weaver, Allison Park, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Jun. 20, 1988, Ser. No. 208,466

Int. Cl.[4] C25C *3/36, 3/24, 7/00, 7/04*

U.S. Cl. 204—71 43 Claims



1. A method for making a light metal-alkali metal master alloy using alkali metal-containing scrap, said method comprising:

(a) establishing an electrolytic cell divided into two or more substantially laterally adjacent areas by means for transporting alkali metal ions from a first cell area supplied with alkali metal-containing scrap to a second cell area consisting essentially of molten light metal;

(b) supplying current to the cell at a sufficient rate for transporting alkali metal ions from the first cell area to the second cell area;

(c) forming master alloy by combining alkali metal ions with said molten light metal in the second cell area; and

(d) withdrawing master alloy from the second cell area.

4,882,018

ELECTROLYTIC DEMETALLIZATION OF DILUTE SOLUTIONS USING ION EXCHANGE RESINS

Richard P. Tison, Pontiac, Mich., assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 28,387, Mar. 20, 1987, abandoned. This application Apr. 5, 1988, Ser. No. 178,032

Int. Cl.[4] C25C *1/00*

U.S. Cl. 204—105 R 1 Claim

1. A method for the electrolytic scavenging of dissolved metal from a dilute, aqueous solution containing cationic species of said metal and depositing said metal onto a cathode contacting said solution comprising the steps of:

disposing said solution between said cathode and an anode in an electrochemical cell;

providing a packed bed consisting essentially of strongly acidic, cation exchange resin particles in said solution so as to contact said cathode, said particles being substantially saturated with said species so as to have an electrical conductance attributable to said species which is greater than the electrical conductance of said solution attributable to said species;

maintaining a substantially quiescent layer of said solution contiguous said cathode;

impressing a voltage between said anode and cathode of sufficient magnitude to deposit said metal onto said cathode; and

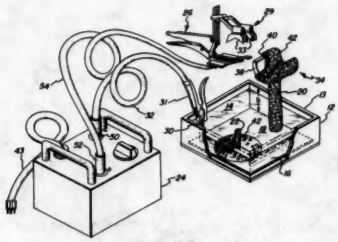
passing sufficient current between said anode and cathode to deposit said metal on said cathode;

whereby the deposition current efficiency, of the solution-bed mix exceeds that of said solution alone, the energy consumed per kilogram of said metal deposited is reduced, higher metal deposition rates are achieved, and improved deposit quality at said rates is obtained.

4,882,019
APPARATUS AND METHOD FOR POLISHING A PLUMBING OR ELECTRICAL FIXTURE

Michael M. Lewy, R.D. #1, Priddle Point, Gloversville, N.Y. 12078

Filed Nov. 21, 1988, Ser. No. 274,005
Int. Cl.[4] C25F 3/16, 7/00
U.S. Cl. 204—129.1 24 Claims



22. A method for polishing a metallic plumbing fixture having a circular cross-section and an elongate metallic electrical fixture, said polishing method comprising the steps of:

providing an electrochemically inert container with an electrolytic solution therein and a cathode member at least partially immersed within said solution, said cathode member having at least one column specially configured for receiving circular-shaped and elongate fixtures;

providing dc power supply means having a negative terminal and a positive terminal;

electrically connecting said negative power supply terminal to said cathode member;

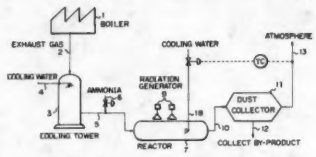
electrically clamping the positive terminal of said power supply means to a metallic plumbing fixture having a circular cross-section or an elongate metallic electrical fixture to be polished; and

moving said fixture to a position in near engagement with said at least one specially designed cathode member column such that said fixture is electropolished.

4,882,020
PROCESS FOR TREATING EFFLUENT GAS

Akihiko Maezawa, Kanagawa; Yoshio Nakajima; Mitsuyoshi Kaneko, both of Tokyo, and Shinji Aoki, Tokyo, all of Japan, assignors to Ebara Corporation, Tokyo, Japan

Filed May 27, 1988, Ser. No. 199,859
Claims priority, application Japan, May 30, 1987, 62-136067; Dec. 7, 1987, 62-308887
Int. Cl.[4] B01J 19/08
U.S. Cl. 204—157.3 16 Claims

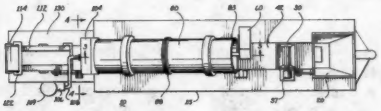


1. A process for treating an effluent gas including the steps of leading an effluent gas containing at least one harmful component selected From the group consisting of sulfur oxides (SO_X) and nitrogen oxides (NO_X) to a radiation irradiation zone, adding ammonia (NH_3) to the effluent gas before, during or after the irradiation, collecting resulting reaction products including ammonium sulfate and ammonium nitrate by means of a dust collector, and releasing the effluent gas into the atmosphere, wherein the improvement comprises using as said dust collector a bag filter alone or a combination of an electrostatic precipitator and a bag filter, and spraying cooling water upon the irradiated effluent gas on the downstream side of the irradiation zone in the reactor, thereby adjusting the effluent gas temperature at the outlet of said bag filter within the range of from a temperature at which the humidity of the effluent gas is saturated to 100° C.

4,882,021
APPARATUS AND METHOD FOR SOIL DECONTAMINATION

Daniel H. Barnhart, 2043 E. Quartz, Mesa, Ariz. 85203

Filed Jan. 15, 1988, Ser. No. 144,928
Int. Cl.[4] B01J 19/08
U.S. Cl. 204—157.15 14 Claims



1. An apparatus for decontaminating soil, comprising:

a mixer;

a first conveyer having an output end connected to an input of said mixer;

first hopper means for holding said soil and distributing it onto an input end of said first conveyor;

second hopper means for holding a catalytic compound and adding it to said distributed soil;

introduction means for introducing an oxidant into said input end of said mixer, said mixer being operable to mix said soil, catalyst and oxidant and thereby provide mixed soil;

a second conveyer operable to collect said mixed soil from an output end of said mixer; and

means for radiating said collected mixed soil with ultraviolet light.

4,882,022
PROCESS AND APPARATUS FOR SPUTTER COATING A GOLD ALLOY ONTO A SUBSTRATE

Dieter Hoffman, Bruchköbel; Wolf-Dieter Münz; G. A. Horst Siewert, both of Freigericht, and Horst Dietrich, Biebergemünd, all of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft and Demetron Gesellschaft Fuer Elektronik-Werkstoffe mbH, both of Hanau, Fed. Rep. of Germany

Division of Ser. No. 921,235, Oct. 20, 1986, Pat. No. 4,808,373. This application Aug. 9, 1988, Ser. No. 230,235
Claims priority, application Fed. Rep. of Germany, Sep. 19, 1986, 3631830
Int. Cl.[4] C23C 14/34
U.S. Cl. 204—192.15 12 Claims

1. A process for sputter coating a substrate in a cathode sputtering apparatus having an alloy target, said process comprising

selecting a target alloy having gold in a range of 90 to 98 percent by weight and aluminum in a range of 0.5 to 10 percent by weight, the balance comprising copper; and

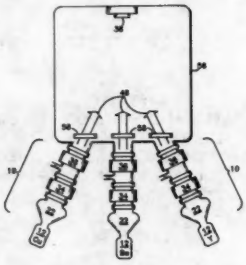
sputter coating said substrate with said alloy.

4,882,023

METHOD AND SYSTEM FOR PRODUCING THIN FILMS

Mark Wendman, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 14, 1988, Ser. No. 168,055
Int. Cl.[4] C23C 14/00
U.S. Cl. 204—192.31 4 Claims



1. A method for forming multiple-component thin films on a substrate comprising the steps of:

for each of at least two of the components of a thin film:

generating a separate ion-cluster beam by separate vaporization of the components in an isolated, heated crucible, the crucible having a beam exit nozzle and a source controller for regulating the quantity of the component leaving the crucible;

directing the ion-cluster beam toward the substrate by accelerating the beam through an accelerating voltage;

measuring an extraction current across the accelerating voltage to obtain a real time signal for monitoring the stoichiometry of the film;

feeding back the real time signal to the source controller to increase or decrease the supply of the component to maintain the quantity of ionclusters distributed by the beam to the substrate within a predetermined stoichiometric proportion;

fracturing the ion-cluster beam into an atomic ion beam with microwave energy after the ion-cluster beam leaves the crucible;

generating an oxygen plasma with microwave energy, the oxygen plasma being confined in an isolated oxygenating chamber separated from a deposition chamber with differential pumping seals; and

passing the atomic ion beam through the oxygen plasma in the isolated oxygenating chamber to incorporate oxygen into the atomic ion beam.

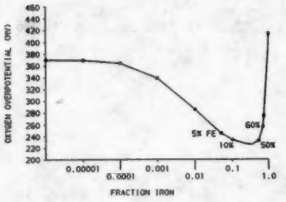
4,882,024

HYDROGEN GENERATOR HAVING A LOW OXYGEN OVERPOTENTIAL ELECTRODE

Dennis A. Corrigan, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 36,193, Apr. 8, 1987, abandoned, which is a continuation of Ser. No. 834,281, Feb. 25, 1986, abandoned. This application Feb. 17, 1988, Ser. No. 157,516
Int. Cl.[4] C25C 7/02; C25B 11/06
U.S. Cl. 204—242 3 Claims

1. In an alkaline, electrolytic hydrogen generator comprising an hydrogen-evolving cathode, an oxygen-evolving anode and an aqueous alkai metal hydroxide electrolyte between said anode and cathode, the improvement wherein said anode includes a catalyst supported on a conductive substrate and comprising a composite hydrous oxide of nickel and iron in



which the nickel content varies from about 0.6 to about 19 parts nickel per part iron.

4,882,025

PVC WOVEN DIAPHRAGM FOR THE ELECTROLYSIS OF HYDROCHLORIC ACID

Patrice Hugues, Marcq en Baroeuil, and Jean-Maurice Perineau, Villiers sur Marne, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Jul. 8, 1988, Ser. No. 216,334
Claims priority, application France, Jul. 9, 1987, 8710094
Int. Cl.[4] C25B 9/00, 13/08
U.S. Cl. 204—252 15 Claims

1. A heat-set woven diaphragm based on polyvinyl chloride and adapted for the electrolysis of hydrochloric acid, comprising:

(a) a combination of warp threads and weft threads woven into a cloth weave with a number of crossings per square centimeter ranging from 270 to 350;

(b) warp threads and weft threads which comprise a mixture of atactic polyvinyl chloride and superchlorinated polyvinyl chloride;

(c) an average thickness ranging from 0.5 to 0.7 mm; and

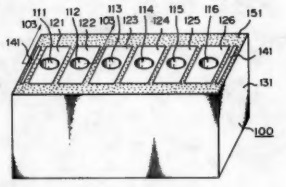
(d) high creasing resistance.

4,882,026

DIELECTRIC BLOCK PLATING APPARATUS

Osamu Yamato, and Tetsuji Takino, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed May 2, 1988, Ser. No. 189,165
Claims priority, application Japan, May 1, 1987, 62-106347
Int. Cl.[4] C25D 17/00
U.S. Cl. 204—275 9 Claims



1. A dielectric block plating apparatus for forming conductive layers by an electroplating process over surfaces of a dielectric block, having parallel through holes extending from a top surface of the block to a bottom surface thereof and coated with a ground conductive layer formed by an electroless plating process, in a plating tank filled with an electrolytic solution, said apparatus comprising:

holding means for holding the dielectric block within the electrolytic solution in an orientation with axes of the through holes of the block extending in a direction;

electrolytic solution circulating means for circulating the electrolytic solution under pressure through said plating tank;

means for controlling the flow of the electrolytic solution so as to flow through said plating tank in said direction and thereby parallel to the axes of the through holes;

voltage applying means for applying a negative voltage to the ground conductive layer formed on the dielectric block; and

voltage applying means for applying a positive voltage to the electrolytic solution, said positive voltage applying means being positioned within said plating tank to face and confront entrances of the through holes in the block when the block is held in said orientation by said holding means.

4,882,027

CATHODE HANGERS

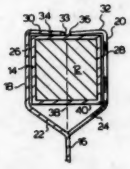
Nico Borst, Connaught; Marc D. Talbot, and James D. Scott, both of Timmins, all of Canada, assignors to Kidd Creek Mines Ltd., Toronto, Canada

Filed Feb. 6, 1987, Ser. No. 11,949

Claims priority, application Canada, Feb. 6, 1986, 501300

Int. Cl.[4] C25C *7/02*

U.S. Cl. 204—286 **6 Claims**



1. A cathode for use in electrolytic refining or electrowinning of copper, comprising: a mild steel or iron hanger bar having a rectangular cross-section providing flat upper and lower surfaces and flat opposite side surfaces; a copper cladding enveloping said hanger bar; said hanger bar having end portions adapted to be seated on electrical contacts; a flat stainless steel starter sheet having an upper edge with a plurality of lugs formed along said upper edge, alternating lugs along said upper edge being bent in opposite directions to abut and engage opposite side faces of the copper-clad hanger bar, said stainless steel lugs being welded to the copper cladding by high silicon copper wire whereby said stainless steel starter sheet is rigidly secured to the hanger bar substantially perpendicular to and centrally aligned with the hanger bar lower surface.

4,882,028

R-F ELECTRODES FOR REMOVABLY PROVIDING ELECTRICAL ENERGY TO AN APPARATUS DURING R-F ENERGY REACTIVE TREATMENT PROCESSES

Navjot Chhabra, Boise, Id., assignor to Micron Technology, Inc., Boise, Id.

Filed Jan. 22, 1988, Ser. No. 147,315

Int. Cl.[4] B05C *13/00*; C23F *1/02*; C23C *16/00*

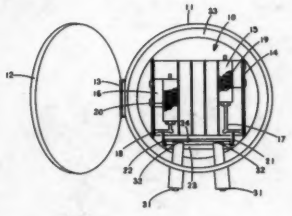
U.S. Cl. 204—298 **8 Claims**

1. A ratio frequency (R-F) electrode apparatus for removably providing electrical energy to a chemical vapor deposition and plasma etching system during R-F energy reactive treatment processes being carried out in an existing evacuable reaction chamber, the apparatus comprising:

a plurality of base electrode means removably attached to existing feed throughs fixedly mounted on said reaction chamber for transmitting R-F energy from outside the reaction chamber to inside the reaction chamber;

a plurality of upper electrode means oriented to permit controllable electrical and physical contact of said upper electrode means with said base electrode means and removably and electrically attached inside the reaction chamber to upper electrode holder means;

the electrode holder means electrically and removably attached to an existing workholder in a horizontally disposed reaction chamber, the workholder being for retaining substrates in the reaction chamber during substrate processing and the upper electrode holder means being for



adjustably holding and controlling the mechanical and electrical relations of the upper electrode means with the base electrode means which oppose and are oriented to permit electrical and physical contact with said upper electrode means;

a ceramic insulator means for enclosing, insulating and supporting the base electrode means within the reaction chamber.

4,882,029

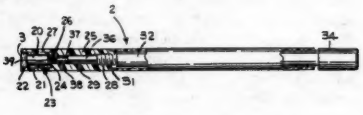
ELECTRODE SYSTEM

Guenter Eickmann, Grove City, Pa., assignor to Pine Instrument Company, Grove City, Pa.

Filed Feb. 10, 1987, Ser. No. 12,884

Int. Cl.[4] G01N *27/46*

U.S. Cl. 204—400 **11 Claims**

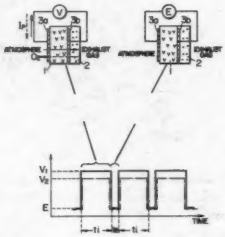


1. An electrode for electrically sensing characteristics of electrolytic fluids being tested comprising an electrode disc core, a TFE fluorocarbon plastic liner receiving the electrode disc core assembled therein and sealed thereto, a PCTFE plastic shroud having a first bore portion, said first portion having the assembled electrode disc core and liner received and sealed therein, the PCTFE plastic shroud having a second bore portion receiving at least part of an electrode contact, and a spring extending in the second bore portion between the electrode contact and the electrode disc core to complete the conductive path from the disc selectively submerged in the fluid .

4,882,030
AIR-FUEL RATIO DETECTION SYSTEM FOR ENGINE EXHAUST GAS

Seikoo Suzuki, Hitachiota; Masayuki Miki, Katsuta, both of Japan; Takao Sasayama, Tarrytown, N.Y.; Minoru Osuga, and Yoshishige Oyama, both of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 891,645, Aug. 1, 1986, abandoned. This application Aug. 30, 1988, Ser. No. 239,008
Claims priority, application Japan, Aug. 2, 1985, 60-169841
Int. Cl.[4] G01N *27/46*
U.S. Cl. 204—406 21 Claims



1. An air-fuel ratio detection system for measuring the air-fuel ratio of a gas mixture burned to produce an exhaust gas, comprising:

a solid electrolyte;

first and second electrodes formed on the surface of said solid electrolyte;

means for passing jump currents through said solid electrolyte between said first and second electrodes;

said first electrode being exposed to atmospheric air and said second electrode being exposed to the exhaust gas;

a diffusion resistor formed on said second electrode for controlling exhaust gas diffusion toward said first electrode;

detector circuit means connected to said first and second electrodes for detecting the conditions of the engine exhaust gas and generating an air-fuel ratio signal therefrom, wherein said detector circuit means further controls said pump currents passing means for changing pump currents between said first and second electrodes to zero during a first period of time and measuring an electromotive force generated between said first and second electrodes during said first period of time; and

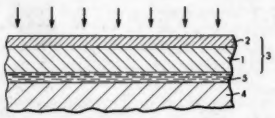
said detector circuit means further including means for controlling said pump currents passing means including means for apply a voltage between said first and second electrodes during a second period of time to keep the electromotive force constant, and means responsive to said pump currents for generating an output signal representing the air-fuel ratio.

4,882,031
GAS SENSOR

Nagakazu Furuya, No. 4-3-31, Ohte 2-chome, Kofu-shi, Yamanashi, Japan, assignor to Nagakazu Furuya and Tanaka Kikinzoku Kogyo K.K., both of, Japan

Filed Dec. 22, 1988, Ser. No. 288,304
Claims priority, application Japan, Dec. 22, 1987, 62-324285
Int. Cl.[4] G01N *27/46*
U.S. Cl. 204—415 3 Claims

1. A gas sensor comprising a membrane for gas sensing which comprises a selective gas permeable membrane and a reaction layer attached thereto; and a counter electrode separated from the reaction layer of the membrane across an electrolyte; the reaction layer having the function of an electrode

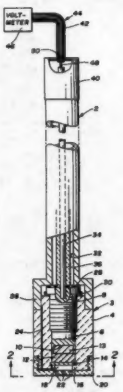


and comprising fine hydrophilic portions and fine hydrophobic portions.

4,882,032
HYDROGEN PROBE

Basant L. Tiwari, Sterling Heights, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 27, 1987, Ser. No. 211,606
Int. Cl.[4] G01N *27/46*
U.S. Cl. 204—422 4 Claims



1. A probe adapted for immersion into a melt of aluminum for responsively electrochemically determining the hydrogen concentration in said melt comprising:

a hydrogen electrode comprising a catalytic metal membrane selectively permeable to the passage of hydrogen therethrough;

a counterelectrode comprising a mixture of calcium and sufficient calcium hydride to provide a predetermined reference hydrogen partial pressure at the temperature of said melt;

a solid state electrolyte interjacent said electrode and said counterelectrode and selected from the group consisting of calcium hydride, calcium hydrochloride and strontium hydrochloride;

a hydrogen accumulation chamber adjacent said membrane for holding gaseous hydrogen at a partial pressure in substantial equilibrium with the hydrogen in said melt;

porous barrier means interjacent said chamber and said melt for separating said hydrogen electrode from deleterious contact with said melt and establishing a gas-liquid interface between said melt an said gaseous hydrogen in said chamber, said barrier means having pores sufficiently small as to prevent said melt from passing therethrough yet sufficiently large as to readily permit hydrogen to pass therethrough; and

electrical contact means extending from said electrode and counterelectrode for coupling to a hydrogen concentra-

tion indicator means responsive to the difference in electrical potential established between said electrode and said counterelectrode incident to the difference between said reference and equilibrium partial pressure.

4,882,033

ELECTROCHEMICAL DEVICE

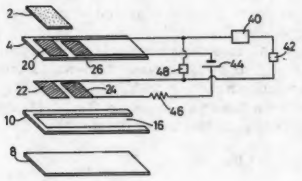
Kazuyoshi Shibata, and Yoshihiko Mizutani, both of Nagoya, Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Continuation of Ser. No. 764,646, Aug. 12, 1985, abandoned. This application Jun. 8, 1987, Ser. No. 57,645

Claims priority, application Japan, Aug. 21, 1984, 59-174530

Int. Cl.[4] G01N *27/46*

U.S. Cl. 204—425 **12 Claims**



1. An electrochemical device capable of detecting an amount of unburned components in a richburned measurement gas and the partial pressure of oxygen in a lean-burned measurement gas, comprising:

an electrochemical sensing cell which includes (a) a planar oxygen-ion conductive solid electrolyte structure, (b) first and second electrodes of a porous structure disposed on the planar solid electrolyte structure such that the first and second electrodes are spaced apart from each other, (c) diffusion resistance means which has a predetermined diffusion resistance to said rich-burned measurement gas, and diffusion resistance means covering the first electrode such that the first electrode is exposed to the rich-burned measurement gas via the diffusion resistance means, (d) means for introducing a reference gas having a predetermined oxygen partial pressure for exposure of the second electrode to the reference gas, said means for introducing a reference gas having a diffusion resistance that restricts a supply of oxygen to said second electrode during an operation of the device in the rich-burned measurement gas, (e) a DC power source for applying an electric current between said second electrode and said first electrode, said power source being adapted to pass current from said second electrode to said first electrode when the measurement gas is lean-burned for detecting oxygen partial pressure of the measurement gas, and being adapted to pass current from said first electrode to said second electrode when the measurement gas is rich-burned to move oxygen in said reference gas from the second electrode to the first electrode for burning said unburned components of said rich-burned measurement gas which has been diffused to said first electrode through said diffusion resistance means; and

an electrochemical pumping cell which includes (a) said planar oxygen-ion conductive solid electrolyte structure, (f) an inner and an outer electrode of a porous structure disposed on said planar solid electrolyte structure such that the inner and outer electrodes are spaced apart from each other, said inner electrode being exposed to an atmosphere that is substantially the same as said reference gas to which said second electrode is exposed, said outer electrode being exposed to said rich-burned measurement gas, and (g) means for inducing a flow of electric current from said inner electrode to said outer electrode and thereby supplying an oxygen component of said rich-burned measurement gas into said reference gas to which said second electrode is expressed, whereby shortage of oxygen in said reference gas is prevented when oxygen in the reference gas moves to said first electrode of the sensing cell, with the electric current flowing from said first electrode to said second electrode.

4,882,034

CRUDE OIL OR FUEL OIL COMPOSITIONS

Robert D. Tack, Oxford, and Kenneth Lewtas, Wantage, both of United Kingdom, assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Mar. 11, 1988, Ser. No. 166,874

Claims priority, application United Kingdom, Mar. 18, 1987, 8706369

Int. Cl.[4] C10L *1/22*

U.S. Cl. 208—15 **25 Claims**

1. A crude oil composition or a fuel oil composition comprising a major proportion by weight of a crude oil or a liquid hydrocarbon fuel and a minor porportion by weight of a polymer containing more than one amide group, the amide being an amide of a secondary mono amine and wherein the amide group of the polymer contains a hydrogen- and carbon-containing group of at least 14 carbon atoms, provided that if the polymer is derived from the polymerisation of an aliphatic olefin and maleic anhydride, the polymer must have both an amide group and an ester group each of which contains a hydrogen- and carbon-containing group of at least 14 carbon atoms.

4,882,035

PROCESS FOR IMPROVING THE DESHAFTING OF A HEAVY HYDROCARBON FEEDSTOCK

Roben Loutaty, Le Havre; Pierre Maroy, Versailles, and Gilles Trinquet, Le Havre, all of France, assignors to Compagnie de Raffinage et de Distribution Total France, France

Filed Aug. 12, 1987, Ser. No. 84,637

Claims priority, application France, Aug. 12, 1986, 86 11638

Int. Cl.[4] C10C *1/18*

U.S. Cl. 208—45 **21 Claims**

1. A process for improving the deasphalting of a heavy hydrocarbon feedstock comprising a mixture of an oil phase and an asphaltic phase with a solvent, the process comprising subjecting the feedstock to a shearing at a rate of at least about $10^3\ s^{-1}$ before or after the addition of at least a portion of the solvent to the feedstock and includes deasphalting the feedstock by solvent extraction.

4,882,036

COMBINATION COKING AND HYDROCONVERSION PROCESS

Clarence M. Eidt, Jr., Chatham, N.J.; Clyde L. Aldrige, and Roby Bearden, Jr., both of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation of Ser. No. 97,121, Sep. 16, 1987, abandoned. This application Dec. 27, 1988, Ser. No. 291,390

Int. Cl.[4] C10G *69/06, 69/10*

U.S. Cl. 208—50 **19 Claims**

1. An integrated coking and hydroconversion process which comprises the steps of:

(a) treating a hydrocarbonaceous feed having a Conradson carbon content of at least 5 weight percent in a coking zone maintained under fluidized coking conditions, including a pressure ranging from zero to about 100 psig, to produce coke and a vapor phase product, including hydrocarbonaceous comprising constituents boiling above 975° F.;

(b) passing the vapor phase product to a scrubbing zone;

(c) separating a heavy bottoms fraction in the scrubbing zone having a Conradson carbon content of at least about 5 weight percent, including said constituents boiling above 975° F., from said hydrocarbonaceous material;

(d) passing the heavy bottoms fraction through a microfiltration system characterized as containing a filtering means comprised of a sintered porous ceramic or metal membrane and having a substantially uniform pore size capable of retaining at least 95 percent of the solids and capable of maintaining an effective flux, thereby resulting in a solids-laden fraction and a hydrocarbonaceous filtrate;

(e) recycling at least a portion of the solidsladen fraction to the coking zone;

(f) adding a hydroconversion catalyst or hydroconversion catalyst precursor to at least a portion of said hydrocarbonaceous filtrate to form a mixture;

(g) subjecting at least a portion of said mixture of step (f) to hydroconversion conditions, in the presence of hydrogen, in a slurry hydroconversion zone to produce a hydroconverted oil;

(h) passing the hydroconverted oil to a microfiltration system substantially the same as the microfiltration system in (d), above, wherein solids suspended in the hydroconverted oil are removed; and

(i) passing the filtrate resulting from the filtration of step (h) above to a liquid-liquid separation wherein the resulting heavy fraction is recycled to the coking zone.

4,882,037

PROCESS FOR TREATING A TEMPERATURE-SENSITIVE HYDROCARBONACEOUS STREAM CONTAINING A NON-DISTILLABLE COMPONENT TO PRODUCE A SELECTED HYDROGENATED DISTILLABLE LIGHT HYDROCARBONACEOUS PRODUCT

Tom N. Kalnes, La Grange, and Robert B. James, Jr., Northbrook, both of Ill., assignors to UOP, Des Plaines, Ill.

Filed Aug. 15, 1988, Ser. No. 232,261

Int. Cl.[4] C10G *49/00, 65/04*

U.S. Cl. 208—85 **15 Claims**

1. A process for treating a temperature-sensitive hydrocarbonaceous stream containing a non-distillable component and a distillable, hydrogenatable hydrocarbonaceous fraction to produce a selected hydrogenated distillable light hydrocarbonaceous product, a distillable heavy hydrocarbonaceous product and a heavy product comprising said non-distillable component while minimizing thermal degradation of said temperature-sensitive hydrocarbonaceous stream which process comprises the steps of:

(a) contacting said temperature-sensitive hydrocarbonaceous stream with a hot first hydrogen-rich gaseous stream having a temperature greater than said hydrocarbonaceous stream in a flash zone at flash conditions thereby increasing the temperature of said hydrocarbonaceous stream and vaporizing at least a portion thereof to provide a first hydrocarbonaceous vapor stream comprising hydrogen and a first heavy product stream comprising said non-distillable component;

(b) condensing at least a portion of said first hydrocarbonaceous vapor stream to provide a distillable heavy hydrocarbonaceous liquid stream and a second hydrocarbonaceous vapor stream comprising hydrogen and said hydrogenatable, hydrocarbonaceous fraction;

(c) contacting said second hydrocarbonaceous vapor stream comprising hydrogen from step (b) with a hydrogenation catalyst in a hydrogenation reaction zone at hydrogenation conditions to increase the hydrogen content of said hydrogenatable hydrocarbonaceous fraction introduced into said hydrogenation reaction zone;

(d) condensing at least a portion of the resulting effluent from said hydrogenation zone to provide a second hydrogen-rich gaseous stream and a liquid stream comprising hydrogenated distillable hydrocarbonaceous compounds; and

(e) recovering said selected hydrogenated distillable light hydrocarbonaceous product from said liquid stream comprising hydrogenated distillable hydrocarbonaceous compounds.

4,882,038

PROCESS FOR THE USE OF MAGNESIUM-ALUMINUM-PHOSPHORUS-SILICON-OXIDE MOLECULAR SIEVE COMPOSITIONS

Brent M. T. Lok, New City; Lawrence D. Vail, New Rochelle, and Edith M. Flanigen, White Plains, all of N.Y., assignors to UOP, Des Plaines, Ill.

Division of Ser. No. 600,180, Apr. 18, 1984, Pat. No. 4,758,419. This application Feb. 16, 1988, Ser. No. 155,696

The portion of the term of this patent subsequent to Apr. 26, 2005, has been disclaimed.

Int. Cl.[4] C10G *47/02*

U.S. Cl. 208—111 **5 Claims**

1. Process for converting a hydrocarbon which comprises contacting said hydrocarbon under hydrocarbon converting conditions with a molecular sieve, said molecular sieve being a crystalline molecular sieve having three-dimensional microporous framework structures of MgO_2, AlO_2, PO_2 and SiO_2 tetrahydral units having an empirical chemical composition on an anhydrous basis expressed by the formula:

$$mR:(Mg_wAl_xP_ySi_z)O_2$$

wherein "R" represents at least one organic templating agent present in the intracrystalline pore system; "m" represents the molar amount of "R" present per mole of $(Mg_wAl_xP_ySi_z)O_2$ and has a value between zero (0) and about 0.3; and "w", "y" and "z" represent the mole fractions of magnesium, aluminum, phosphorus and silicon, respectively, present as tetrahedral oxides, said mole fractions being such that they are within the pentagonal compositional area defined by points A, B, C, D, and E of FIG. 1 and each has a value of at least 0.01.

4,882,039

CATALYTIC CRACKING OF HYDROCARBONS WITH OXYGEN PROMOTED ALKALI METAL ZEOLITE CRACKING CATALYST

Nai Y. Chen, Titusville, N.J., and Thomas F. Degnan, Yardley, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 937,938, Dec. 4, 1986, abandoned. This application Jan. 3, 1989, Ser. No. 292,691

Int. Cl.[4] C10G *11/02*

U.S. Cl. 208—120 **26 Claims**

1. A process for the catalytic cracking of a hydrocarbon oil which comprises contacting the oil with 0.001 to 0.1 weight parts of oxygen for each weight of oil at a temperature in excess of 1000° F. with a catalyst which is essentially free of shape selective combustion catalyst and comprising a large pore, alkali metal silicate zeolite cracking catalyst.

4,882,040

REFORMING PROCESS

Ralph M. Dessau, Edison, N.J., and Ernest W. Valyocsik, Yardley, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jun. 24, 1988, Ser. No. 210,949

Int. Cl.[4] C10G *35/06*

U.S. Cl. 208—138 **40 Claims**

1. A process for reforming a naphtha feedstock of low octane value comprising contacting the feedstock, under reforming conditions, with a non-acidic catalyst composition consisting essentially of

a reforming hydrogenation/dehydrogenation metal in combination with

a non-acidic microporous crystalline material containing thallium or lead, and

wherein said non-acidic microporous crystalline material is isostructural with a zeolite, selected from the group consisting of ZSM-5, ZSM-11, ZSM-12, ZSM-20, ZSM-23, ZSM-48, ZSM-50, and zeolite beta,

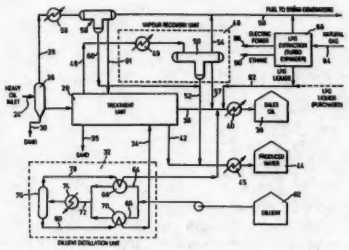
recovering a reformate having an octane value greater than that of the feedstock and having an aromatic content greater than that of the feed.

4,882,041

DILUENT SUBSTITUTION PROCESS

Jeffery E. Scott; David W. McDougall, and Ronald G. Holcek, all of Calgary, Canada, assignors to Delta Projects Inc., Calgary, Canada

Filed Jun. 9, 1987, Ser. No. 59,697
Claims priority, application Canada, Mar. 6, 1986, 503434
Int. Cl.[4] C10G *31/06*
U.S. Cl. 208—177 **7 Claims**



1. A process for the treatment of a heavy oil production stream, comprising the steps of:

removing sand and water from said stream;

adding a hydrocarbon diluent to said stream to reduce the density and viscosity of the heavy oil;

removing from the heavy oil of reduced density and viscosity light components including methane and carbon dioxide and reduce the vapour pressure of the stream; and,

injecting into said stream after removal of said light components, a liquidified petroleum gas (LPG) diluent stream to lower the viscosity of the heavy oil production stream and form a sales oil stream.

4,882,042

FLOSS SEPARATING APPARATUS AND METHOD

Koichi Manable, Chiba; Mitsumura Naka, and Mitsushi Futamura, both of Osaka, all of Japan, assignors to Sumitomo Chemical Company, Ltd. and The Nippon Aluminum Manufacturing Company, Ltd., both of Osaka, Japan

Continuation of Ser. No. 3,007, Jan. 13, 1987, abandoned. This application Nov. 25, 1988, Ser. No. 275,829
Claims priority, application Japan, Jan. 13, 1986, 61-6018
Int. Cl.[4] B07B *3/00*
U.S. Cl. 209—138 **6 Claims**

1. A floss separating apparatus, comprising:

a hopper with a closure structure having an outer cylindrical wall arranged such that said hopper extends vertically;

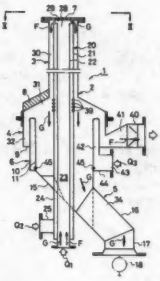
a pipe-shaped structure arranged inside said hopper in such a manner that said pipe-shaped structure extends vertically and coaxially with said hopper so that a passageway space annular in section is formed between said hopper wall and said pipe-shaped structure, said passageway space providing a particle flow down section, a floss separating section and a particle discharging passageway which are arranged in the stated order from above;

a particle scattering section formed in a space at an upper end of said hopper, wherein an outlet of a particle conveying passageway for conveying particles with a primary gas is communicated with a central portion of said particle scattering section, a striking plate is provided at a position where said striking plate confronts with said outlet of said particle conveying passageway, and an upper end of said particle flow down section is communicated with the periphery of said particle scattering section;

a partition wall structure surrounding said particle discharge passageway;

an annular floss discharging passageway disposed around said partition wall structure, an upper end of said floss passageway communicated with an outer periphery of said floss separating section;

a secondary gas passageway formed inside said pipe-shaped structure;



a plurality of secondary gas jetting outlets formed in a part of said pipe-shaped structure which is surrounded by said floss separating section in such a manner that said secondary gas jetting outlets are distributed around said pipe-shaped structure; and

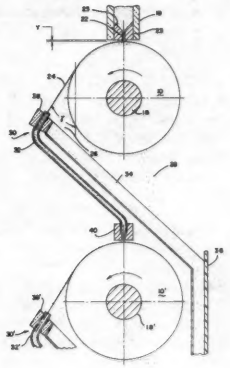
a particle discharging mechanism connected to a lower outlet of said particle discharging discharging passageway, said particle discharging mechanism discharging particles while substantially interrupting the flow of gas.

4,882,043

COMBINATION ROLL-TYPE MAGNETIC AND ELECTROSTATIC SEPARATOR AND METHOD

Lothar Jung, 1355 Plymouth Rd., Bridgewater, N.J. 08807

Filed Jan. 8, 1987, Ser. No. 1,384
Int. Cl.[4] B03C *1/02*
U.S. Cl. 209—212 **22 Claims**



15. A method for separating a diamagnetic material from a dry admixture of particulate diamagnetic material and paramagnetic material, said method comprising:

providing a separator roll having a plurality of disc shaped

magnetic elements and a plurality of spacer elements interposed between adjacent magnetic elements;

rotating said roll;

feeding discrete streams of said admixture onto spaced areas on the surface of said roll whereby said admixture in each of said streams separates laterally on the face of said roll to form alternating bands of paramagnetic material and bands of diamagnetic material;

separately collecting each band of said diamagnetic material into separate receptacles and collecting said paramagnetic material separate from said diamagnetic material, as said materials leave the rotating roll surface.

4,882,044

SCREENING ARRANGEMENT

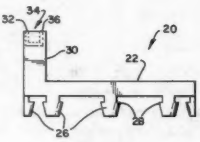
Manfred F. A. Freissle, Aschau-Chiemgau, Fed. Rep. of Germany, assignor to Polydeck Screen Corporation, Spartanburg, S.C.

Filed Jun. 16, 1988, Ser. No. 207,400

Claims priority, application United Kingdom, Sep. 26, 1987, 8722672; Mar. 19, 1988, 8806575

Int. Cl.[4] B07B *1/46*

U.S. Cl. 209—319 **14 Claims**



1. A screening panel predominantly of a synthetic plastics material and having a screening surface in which screening apertures are provided and having securing means adapted to secure the panel releasably in a side-by-side relationship with similar panels, the panel including one spacer element along one peripheral edge of the panel and extending in a direction transverse to the screening surface of the panel and being integral and unitary with the panel so that in side view the panel is substantially L-shaped, the spacer element being adapted to space the screening surface of the panel from a second screening surface substantially parallel to the screening surface of the panel so that screened material passing through one of the screening surfaces can fall onto the other screening surface to be screened further by that screening surface.

4,882,045

DISPERSAL APPARATUS WITH ROTATION VALVING

Robert J. Bergh, Sr., and Robert J. Bergh, Jr., both of 923 N. Park St., Fergus Falls, Minn. 56537

Continuation of Ser. No. 894,683, Aug. 8, 1986, abandoned. This application Aug. 18, 1988, Ser. No. 233,559

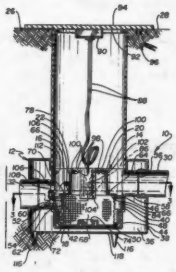
Int. Cl.[4] B01D *35/02*

U.S. Cl. 210—86 **7 Claims**

1. Dispersal apparatus for filtering and valving effluent, having suspended solids entrained therein, discharged from a sewage tank through a generally horizontally-disposed, buried egress conduit, comprising:

(a) a housing, formed relative to an axis, defining a plane at an axial end thereof, said housing being positioned beneath the ground surface with said plane disposed generally horizontally, said housing having an enclosing wall with an inlet port formed therein, the inlet port being mated to the egress conduit, and said wall having a plurality of circumferentially spaced outlet ports, spaced axially downwardly from said inlet port, formed therein, each of said outlet ports being mated to a conduit leading to a discrete soil treatment system segment;

(b) a core received within said housing for rotation therewithin about a generally vertically extending axis generally coinciding with said axis with respect to which said housing is formed, said core having a side wall with a port, registrable with each of said outlet ports, formed therein, and an upper, apertured wall disposed at a location at least as low as a bottom lip of said inlet port;



(c) a filter medium overlying said side wall of said core and said port formed in said core side wall; and

(d) means, suspended within said housing, for sensing effluent level rising within said core to a height proximate said bottom lip of said inlet port.

4,882,046

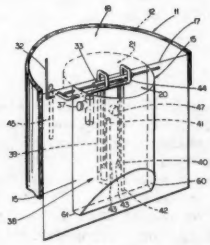
MULTI-CHAMBER SEPTIC TANK ASSEMBLY

Ian Waite, Avalon Beach, Australia, assignor to Biocycle Pty. Ltd., Avalon Beach, Australia

Filed Jan. 12, 1989, Ser. No. 296,505

Int. Cl.[4] C02F *3/30*

U.S. Cl. 210—195.3 **5 Claims**



1. A septic tank assembly comprising:

a first vessel encompassing a space;

a second vessel nested with said first vessel and co-operating therewith to divide said space into two sub-spaces;

partition means co-operating with the two vessels to divide said sub-spaces into four treatment chambers which are generally vertically coextensive;

an inlet duct communicating with a first one of said chambers to deliver waste water thereto for anaerobic treatment;

a first transfer duct extending from an upper portion of said first chamber to said second chamber where the discharge from said first chamber is aerobically treated;

a second transfer duct extending from an upper portion of said second chamber to said third chamber where the discharge of said second chamber is subjected to a clarification treatment;

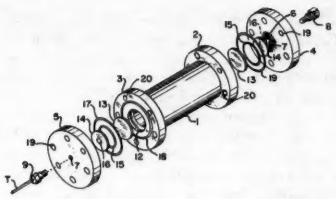
a third transfer duct extending from an upper portion of said

third chamber to a fourth one of said chambers where the discharge of said third chamber is disinfected;
an outlet duct from said fourth chamber through which treated water exits from within said assembly;
an aeration device including an air pump and conduits to deliver air to a lower portion of said second chamber so that air passes upwardly through liquid contained within said second chamber;
a first conveyor means extending from a lower portion of said third chamber to said first chamber to transfer solid matter from said third chamber to said first chamber;
second conveyor means extending from an upper portion of said third chamber to said first chamber to transfer floating matter from said third chamber to said first chamber; and
a sterilizing agent dispenser to deliver a sterilizing agent into said fourth chamber.

4,882,047
ZERO-VOID COLUMN END PLATE FOR CHROMATOGRAPHY

Yehuda Shalon, St. Louis, Mo., assignor to HT Chemicals, Inc., St. Louis, Mo.

Continuation of Ser. No. 67,553, Jun. 26, 1987, abandoned, which is a continuation-in-part of Ser. No. 5,641, Jan. 31, 1987, Pat. No. 4,719,011, which is a continuation of Ser. No. 714,730, Mar. 22, 1985, abandoned. This application Mar. 27, 1989, Ser. No. 328,781
Int. Cl.[4] B01D *15/08*
U.S. Cl. 210—198.2 **13 Claims**



1. A high-pressure liquid chromatography column comprising:
(a) a column member, said column member having a first end and a second end, the interior of said column member being a chamber adapted to retain a media;
(b) a first flange member, said first flange member being positioned at said first end of said column member;
(c) a second flange member, said second flange member being located at said second end of said column member;
(d) a first end plate, said first end plate being adapted to be mounted at said first end of said column member and having an inlet port;
(e) a second end plate, said second end plate being adapted to be mounted at said second end of said column member and having an outlet port;
(f) a first frit means, said first frit means being adapted to be mounted at said first end of said column member, between said first end plate and the interior of said column member, said first frit means being porous and comprising means for providing fluid communication between said inlet port and the interior of said column member;
wherein at least said first end plate includes dispersion means, said dispersion means comprising radially extending grooves in a surface of said first end plate proximate said first frit means, said grooves extending radially toward the periphery of said plate and increasing in volume towards the periphery of said plate, wherein each groove increases in depth in a direction toward the periphery of said plate and wherein each groove also increases in width in a direction towards the periphery of said plate, whereby fluid is adapted to flow uniformly across the surface of said first frit means and consequently uniformly from said column member first end to said column member second end, thereby enhancing the separation attributes of the column during performance of a chromatography process, wherein said first end plate surface includes no other grooves thereon.

4,882,048
OPTICALLY ACTIVE ADSORBENTS

Gottfried Blaschke, Münster; Werner Fraenkel, Bad Rothenfelde; Werner Bröker, Münster, and Joachim Kinkel, Guidental, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft Mit Beschränkter Haftung, Darmstadt, Fed. Rep. of Germany

Continuation of Ser. No. 58,715, Jun. 5, 1987, abandoned. This application Feb. 21, 1989, Ser. No. 313,319
Claims priority, application Fed. Rep. of Germany, Jun. 7, 1986, 3619303
Int. Cl.[4] B01D *15/08*
U.S. Cl. 210—198.2 **12 Claims**

1. An absorbent useful for chromatographic separation of enantiomeric compounds, comprising an optically active poly(meth)acrylamide bonded to a chromatographic support material, prepared by a process consisting essentially of reacting under polymerization conditions a chromatographic support material or a hydrophilically modified chromatographic support material, with an optically active monomer of the formula

$$CH_2=CR^1-CO-NR^2$$
$$\quad\quad\quad

of said plurality of sullied filter plates and for moving said released one plate and carriage along said elongated frame;

a plate washer;

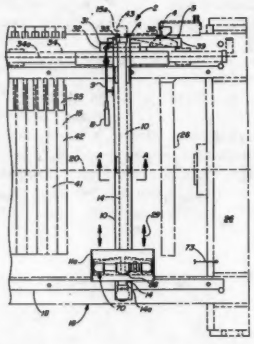
means for intermittently attaching said plate washer to said shifter carriage, such that said shifter carriage and said plate releasing means moves said sullied filter plates in seriatim to a plate washing position to be washed by said attached plate washer;

wherein said carriage comprises:

a pawl box;

a first pawl pivotable in said box and operable to engage and pick up a sullied plate;

a second pawl longitudinally spaced from said first pawl and pivotable in said box to engage and push a washed plate to a follower stack simultaneously with movement of said



sullied plate by said first pawl to a washing position approximately mid-way between a next sullied plate in said plurality of sullied plates;

a third pawl pivotable in said box and longitudinally extending from said first pawl toward and past said second pawl, said third pawl having a sloped cam surface operable to engage a portion of a stacked group of washed plates to depress said third pawl so as to permit said third pawl to pass a plate at a wash position;

spring means for raising said first and second pawls into a raised position to engage, respectively, a sullied and washed plate; and

spring means for raising said third pawl to a raised position so as to impact a sullied plate in said plurality of stacked plates and prevent said first pawl from picking up other than a first sullied plate facing said wash position.

4,882,050

FILTER PLATE, FILTER PLATE ELEMENT, AND FILTER COMPRISING SAME

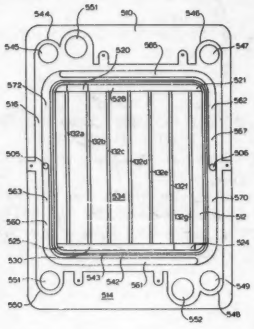
Henry B. Kopf, 108 Coatbridge Cir., Cary, N.C. 27551

Continuation-in-part of Ser. No. 104,177, Oct. 2, 1987. This application Aug. 22, 1988, Ser. No. 235,046

Int. Cl.[4] B01D *25/12, 13/00*

U.S. Cl. 210—231 **6 Claims**

1. A filter plate having a generally rectangular and generally planar shape with a substantially flat bottom surface, a top surface with a first upwardly extending wall circumscribingly bounding a flow channel of generally rectangular shape, and a second upwardly extending wall interior to and of lesser height than the first bounding wall, the second wall being in spaced relation to the first wall along diagonally opposed L-shaped peripheral sections of the flow channel, said first and second walls defining an L-shaped channel there between in said diagonally opposed L-shaped peripheral sections each L-shaped channel comprising a leg extending transversely across the flow channel for a major portion of the width thereof, and a leg extending longitudinally for a portion of length of the flow channel and each longitudinal leg communicating at is extremity with an opening extending through the plate, ridges extending between the first and second bounding walls along peripheral portions of the flow channel not comprising said L-shaped peripheral sections; a liquid inlet port at a first side of the flow channel and a liquid outlet port at a second side of the flow channel opposite the first side thereof, the liquid inlet port being joined in liquid flow communication with a liquid flow feed trough located interior of said second wall and extending transversely across the first side of the flow channel, and the



liquid outlet port being joined in liquid flow communication with a liquid collection trough located interior of said second wall and extending transversely across the second side of the flow channel, with a plurality of spaced-apart partitions extending upwardly from the floor of the flow channel between the liquid feed trough and the liquid collection trough, the partitions being of substantially the same height as the second bounding wall and substantially parallel to one another to define a series of sub-channels between the partitions, extending longitudinally between the liquid feed trough and the liquid collection trough.

4,882,051

CARTRIDGE FILTER INCORPORATING A BAG-LIKE BODY

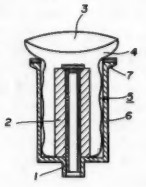
Mikio Itoh, Tokyo, Japan, assignor to Nippon Roki Co., Ltd., Tokyo, Japan

Filed Jul. 8, 1988, Ser. No. 216,306

Claims priority, application Japan, May 26, 1986, 63-68757[U]; Apr. 30, 1988, 63-57314[U]

Int. Cl.[4] B01D *27/08, 35/16*

U.S. Cl. 210—248 **4 Claims**



1. A cartridge filter for filtering a liquid to produce a filtrate, which comprises:

a cartridge filter element contained in a bag-like body made of aqueous non-osmotic film and open at one end thereof, said bag-like body fixed at the other end thereof to the end

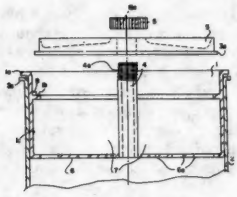
of the cartridge filter element at the exhaust side for the filtrate, and a filter case about the bag-like body having an inlet for the liquid, said bag-like body covered at the open end with an inlet of the filter case, the bag-like body preventing the liquid from contacting interior walls of the filter case.

4,882,052

FILTER STRUCTURE FOR LIQUID PURIFICATION AND INCORPORATING DETENT ARRANGEMENT

Anthony Peranio, Nyack, N.Y., assignor to Purewater Sciences International, Inc., New York, N.Y.

Filed Oct. 23, 1987, Ser. No. 111,869
Int. Cl.[4] B01D *23/02, 23/14*
U.S. Cl. 210—282 19 Claims



1. Filter apparatus for directing the gravity-feed flow of liquid therethrough, comprising:

a filter medium;

inlet and outlet plates arranged respectively above and below said filter medium;

said inlet and outlet plates each having openings to respectively provide for the flow of liquid therethrough;

said inlet plate having openings arranged in a predetermined array;

said outlet plate having a plurality of arrays of openings each being substantially similar to the array of openings in said inlet plate whereby the number of arrays in said outlet plate is substantially equal to 2 more than the number of arrays in said inlet plate; and

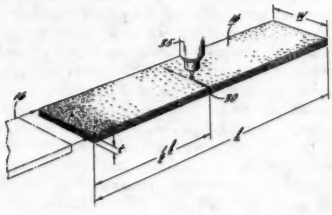
said plates being movable relative to one another to adjustably position the array of said inlet plate substantially directly above one of the arrays in said outlet plate to guide the liquid flow through substantially that portion of the filter medium which is arranged between the aligned arrays of said inlet and outlet plates.

4,882,053

POROUS FILTER MEDIA SUPPORT PLATE

Joseph E. Ferri, 206 Lester Ave., Shillington, Pa. 19607

Filed Mar. 24, 1988, Ser. No. 152,519
Int. Cl.[4] B01D *23/18*
U.S. Cl. 210—293 4 Claims



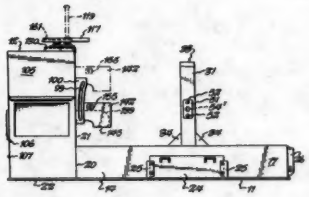
1. An elongated substantially rectangular filter media support plate comprised of a porous heat-fusible organic plastic material, said plate being exposed to a loading by a porous filter media, the pores in the support plate being sized to retain the filter media and waste particulate matter while permitting passage of water in a first direction first through the filter media and then through the support plate and in the reverse direction first through the support plate and then through the filter media, said plate comprising means forming at least one relatively narrow, non-porous heat-fused zone extending across the plate from one side edge to the other and from the upper surface to the lower in a plane extending substantially perpendicularly to said upper and lower surfaces and to said side edges, each said zone sub-dividing the plate into end-to-end abutting porous sub-sections, said plate being performed with each said heat-fused zone forming an integral part of said plate with the composition of the material in the said zone being homogeneous with the material outside of the zone and forming within the zone a substantially rigid, load-bearing beam extending from said one side edge to the other and from the said upper surface to the said lower surface.

4,882,054

VIBRATORY SCREENING MACHINE WITH TILTABLE SCREEN FRAME AND ADJUSTABLE DISCHARGE WEIR

William W. Derrick, East Amherst, and Robert G. Derrick, Buffalo, both of N.Y., assignors to Derrick Manufacturing Corporation, Buffalo, N.Y.

Filed Aug. 22, 1988, Ser. No. 235,038
Int. Cl.[4] B01D *33/00*
U.S. Cl. 210—389 23 Claims



1. A vibratory screening machine comprising a main frame, a screen frame, mounting means mounting said screen frame on said main frame, a screen on said screen frame, means for vibrating said screen frame, a weir fixedly mounted directly on said main frame for containing a liquid-solid mixture, discharge means on said weir for discharging said liquid-solid mixture onto said screen, and adjusting means for adjusting the inclination of said screen relative to said main frame and for adjusting the elevation of said discharge means relative to said weir to thereby maintain the position of said discharge means in substantially the same relative position to said screen in adjusted positions thereof.

4,882,055

UNITARY INJECTION MOLDED FILTER

Robert E. Stamstad, Poynette, Wis., assignor to Suratco Products Company, Poynette, Wis.

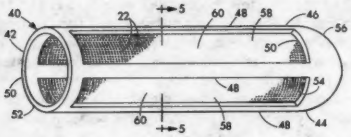
Continuation-in-part of Ser. No. 905,661, Sep. 11, 1986, abandoned. This application Oct. 29, 1987, Ser. No. 117,881
Int. Cl.[4] B01D *25/02*
U.S. Cl. 210—483 20 Claims

1. A unitary injection molded filter for separating small particulate matter from a fluid comprising:

(a) a rigid frame of synthetic resin material to provide a rigid shape to the filter; and

(b) at least one screen of non-woven sheet synthetic resin material with opposed smooth side surfaces made integral with the frame and having formed therethrough a plurality of holes extending between the opposed side surfaces

of the sheet so as to form fluid passages therethrough, each hole having a minimum transverse width within the range of approximately 0.0005 inches to 0.01 inches,



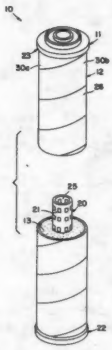
wherein the filter is formed by a process comprising injecting a quantity of thermoplastic resin material into a mold to simultaneously form the frame and the screen of the filter.

4,882,056

FLUID FILTER ELEMENT WITH AN OVERLAPPED WRAP

Peter J. Degen, Huntington, and Colin F. Harwood, Glen Cove, both of N.Y., assignors to Pall Corporation, Glen Cove, N.Y.

Filed Apr. 1, 1988, Ser. No. 176,865
Int. Cl.[4] B01D *27/04*
U.S. Cl. 210—490 **21 Claims**



1. A fluid treatment element comprising:

a permeable cartridge comprising a substantially rigid fluid permeable tubular core and disposed thereon a cylindrical, nonwoven mass of polymeric microfibers substantially free of fiber-to-fiber bonding and secured to each other by mechanical entanglement of the fibers, said cartridge having an external surface and an end;

a permeable wrap spirally wound about and completely covering the external surface of the cartridge and having inner and outer surfaces, first and second edge portions, and an end portion, the second edge portion of the wrap overlapping the outer surface of the wrap and the inner surface of the wrap having a section contiguous to the external surface of the cartridge;

first means for positively fastening the external surface of the cartridge to the contiguous section of the inner surface of the wrap;

second means for positively fastening the outer surface of the wrap and the overlapping second edge portion of the wrap; and

an end cap disposed at the end of the cartridge and including means for securing the end of the cartridge and the end portion of the wrap to the end cap.

4,882,057

COMPOSITION AND PROCESS FOR SEPARATING FLUID MIXTURES

Charles R. Morgan, Brookeville; Cheng-Chi Chen; Thomas A. Blinka, both of Columbia, and Alan S. Obligin, Catonsville, all of Md., assignors to W. R. Grace & Co.-Conn., New York, N.Y.

Filed Nov. 3, 1988, Ser. No. 266,617
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—500.23 **9 Claims**

1. A material comprising properties sufficient for use as a semipermeable fluid separation membrane including a composition of up to about 1,000 microns thick of a polyaromatic polymer including aromatic repeat units of which at least 5 mole percent are substituted by moieties having ethylenically unsaturated carbon bonds wherein the polymer is crosslinked by carbon bonds between the ethylenically unsaturated moieties.

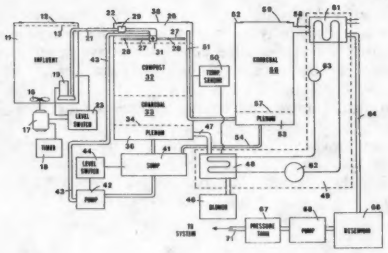
5. A combination comprising a semipermeable fluid separation membrane including as a film of up to about 1,000 microns thick or a hollow fiber a polyaromatic polymer further including aromatic repeat units of which at least 5 mole percent are substituted by moieties having ethylenically unsaturated carbon bonds wherein the polymer is crosslinked through carbon bonds between the ethylenically unsaturated moieties and a mixture of fluids in contact with the membrane wherein at least one of the fluids is enriched on one side of the membrane.

4,882,058

ORGANIC WASTE RECYCLING SYSTEM AND METHOD

R. Edward Burton, Willits, Calif., assignor to Ramos-Thibault Corp., Willits, Calif.

Continuation-in-part of Ser. No. 192,487, May 11, 1988. This application Sep. 21, 1988, Ser. No. 247,245
Int. Cl.[4] C02F *3/00*; C12M *1/04, 1/12*
U.S. Cl. 210—601 **18 Claims**



9. A system for treating a liquid borne organic waste material to recover a useful liquid comprising an influent tank for holding the waste material, a compost bed containing a fecal material for biological treatment of the organic waste material, means for transferring the waste material from the influent tank to the upper portion of the compost bed and permitting the waste material to pass in a downward direction through the compost bed to substantially convert the organic waste material to carbon dioxide and water, a first filter bed positioned beneath and in communication with the compost bed so that the waste material passes in a downward direction through the filter bed after passing through the compost bed, a second filter bed, means for passing air in an upward direction through the first filter bed and the compost bed and through the second filter bed, means for condensing the air to form a condensate after the air passes through the compost and filter beds, and means for discharging the condensate from the system.

15. A method for treating a liquid borne organic waste material to recover a useful liquid comprising the steps of:

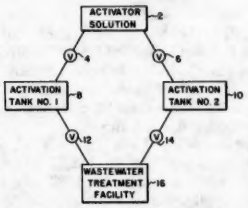
passing the waste material through a compost material to substantially convert the organic waste material to carbon dioxide and water, passing air through the compost material, thereafter passing the air through a filter bed, condensing water vapor in the air from the filter bed to form a condensate, and collecting the condensate.

4,882,059

SOLUBILIZATION OF ORGANIC MATERIALS IN WASTEWATER TREATMENT

John M. Wong, and Thomas J. Lowe, both of Lakewood, Ohio, assignors to General Environmental Science, Beachwood, Ohio

Filed Nov. 25, 1987, Ser. No. 125,388
Int. Cl.[4] C02F *3/34*
U.S. Cl. 210—606 **10 Claims**



1. A method for solubilizing particulate or colloidal materials in wastewater treatment, comprising the steps of:

cultivating aerobic bacteria in the presence of oxygen in an activator solution containing a food source until the level of the food source drops low enough to cause said bacteria to begin producing increased amounts of enzymes which solubilize particulate or colloidal materials thereby producing activated bacteria; and

contacting said activated bacteria or said enzymes with said particulate or colloidal materials under conditions which solubilize said particulate or colloidal materials.

4,882,060

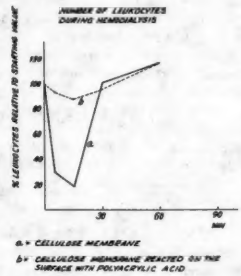
DIALYSIS MEMBRANES WITH IMPROVED COMPATIBILITY

Gottfried Schmer, Seattle, Wash., assignor to Akzo NV, Arnhem, Netherlands

Filed Mar. 28, 1988, Ser. No. 174,093
Claims priority, application Fed. Rep. of Germany, Nov. 12, 1983, 3341113
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—646 **6 Claims**

1. A process for decreasing a leukopenia effect to a patient undergoing a dialysis treatment, comprising the step of:

providing said patent with said treatment which includes use of a dialysis membrane which is formed as a flat foil, a tube foil or a hollow fiber of regenerated cellulose comprising a membrane surface having a polymeric acid chemically bound across a bridgeformer chemically bound to the cellulose, said bridgeformer being an alkylene diamine chemically bound with said polymeric acid across amide linkages, said polymeric acid being selected from the group consisting of a polyacrylic acid. polymethacrylic acid, polymaleic acid, a copolymer with more than 5 Mol% acrylic acid, methacrylic or maleic acid monomer building blocks, and a combination thereof, the average molecular weight of the regenerated cellulose amounting to between 80,000 and 150,000, the average molecular weight of said polymeric acid in said providing step amounting to between 50,000 and 500,000 and being 0.5 to



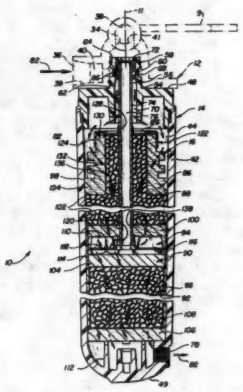
5 times the average molecular weight of the regenerated cellulose.

4,882,061

FILTER APPARATUS

Raymond M. Petrucci, Middlebury; Edward Giordano, Glastonbury; Bruce Hafner, Killingworth, and Bruce G. Taylor, Kensington, all of Conn., assignors to Cuno, Incorporated, Meriden, Conn.

Filed Jan. 23, 1989, Ser. No. 300,566
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—652 **15 Claims**



1. A filter apparatus comprising:

a head having a forward flow inlet port and a reverse flow outlet port; and

a filter cartridge;

said filter cartridge comprising a first end portion secured to the head and a primary chamber in fluid communication with the forward flow inlet port, and a second end portion having a secondary chamber and a combination inlet and outlet port in fluid communication therewith;

a filter assembly disposed in the cartridge, wherein said filter assembly comprises:

a primary filter unit disposed in the primary chamber;

a secondary filter unit disposed in the secondary chamber;

a tube having on one end a passage opening in fluid communication with the reverse flow outlet port and on the

other end a passage opening disposed in the secondary chamber; and

a valve means disposed between the primary chamber and the secondary chamber for permitting forward flow from the primary chamber to the secondary chamber and for preventing reverse flow from the secondary chamber to the primary chamber;

the above providing means wherein forward fluid flow through the inlet port flows sequentially through the primary filter unit, the secondary filter unit and out through the combination inlet and outlet port, and reverse fluid flow through the combination inlet and outlet port flows through the secondary filter unit, through the tube and out through the reverse flow outlet port.

4,882,062

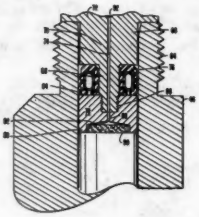
SOLVENT MIXING CHAMBER FOR A LIQUID CHROMATOGRAPHY SYSTEM

Roy P. Moeller, Hayward, and Carl L. Schackelford, San Pablo, both of Calif., assignors to Rainin Instrument Co., Inc., Emeryville, Calif.

Continuation of Ser. No. 902,255, Aug. 29, 1986, abandoned. This application Apr. 29, 1988, Ser. No. 188,680

Int. Cl.[4] B01D *15/08;* **B01F** *13/08;* **C02F** *1/48*

U.S. Cl. 210—656 **8 Claims**



5. A method for simultaneously mixing solvents in a multicompartment mixer in a liquid chromatography system, each compartment containing a stirring magnet, the method comprising the steps of:

generating a rotating magnetic drive field external to the mixer by a single magnet on a single axis of rotation;

supporting each stirring magnet in it compartment for rotation in a plane transverse to the rotating drive field; and

locating the drive field so that it coupled substantially equally to each stirring magnet whereby rotation of the drive field produces stirring rotation by each stirring magnet in its plane of rotation transverse to the rotting drive field.

4,882,063

CHROMATOGRAPHIC SYSTEM

Robert W. Allington, and John N. Jones, both of Lincoln, Nebr., assignors to Isco, Inc., Lincoln, Nebr.

Filed Jul. 13, 1987, Ser. No. 73,079

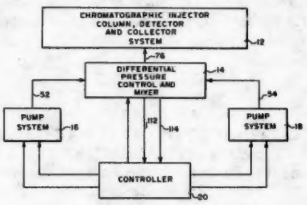
Int. Cl.[4] B01D *15/08*

U.S. Cl. 210—659 **22 Claims**

1. A fluid composition gradient chromatograph comprising:

fluid control means connected in a flow stream between a pumping system comprising at least two pump means,a mixer means and a fixture adapted to receiver chromotographic columns gradient program means;

said control means including inlet means for receiving at least first and second fluids from at least first and second pump means of said pumping system directed to said mixer and signal means for supplying a signal to start a gradient flowing from the gradient program means by said control means in the direction of the chromatographic column when said first and second fluids are sensed to be at substantially the same pressure and preventing the gradient from flowing from the control means in the



direction of the chromatographic column when said first and second fluids differ.

4,882,064

METHOD OF REMOVING IMPURITIES FROM HARD WATERS OR WATERS WITH SIGNIFICANT CALCIUM/MAGNESIUM CONCENTRATIONS

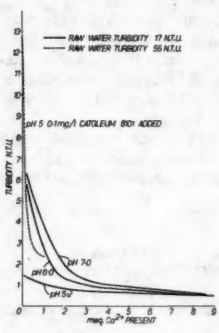
David R. Dixon, and Nevil J. Anderson, both of Victoria, Australia, assignors to Commonwealth Scientific and Research Organization, Campbell, Australia

Continuation of Ser. No. 567,150, Jan. 3, 1984, abandoned, which is a continuation of Ser. No. 363,527, Mar. 30, 1982, abandoned. This application Jun. 19, 1987, Ser. No. 65,153

Claims priority, application Australia, Apr. 6, 1981, PE8330

Int. Cl.[4] B01D *15/04;* **C02F** *5/02*

U.S. Cl. 210—667 **9 Claims**



1. A method for removing suspended impurities and coloured substances from water which has a pH in excess of 5 and contains significant concentrations of calcium and/or magnesium ions which comprises the steps of:

contacting the water at its natural pH with a coagulant/adsorbent which comprises a finely divided particulate mineral material, the individual particles of which have a thin hydroxylated surface layer having a positive zeta potential at the adsorption pH;

separating the thus-treated water from the coagulant/adsorbent;

treating the coagulant/adsorbent with an acidic solution having a pH of not more than 6 to desorb the calcium and/or magnesium ions, washing the thus-treated coagulant/adsorbent with softened water;

treating the coagulant/adsorbent with a softened alkaline solution to raise the pH to at least 10.5, separating the coagulant/adsorbent from the alkaline solution; and

washing the coagulant/adsorbent with softened water;

the softened water used in the washing steps and in the

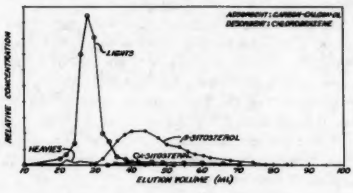
alkaline solution treatment containing not more than 20 ppm of total Ca/Mg.

4,882,065

PURIFICATION OF STEROLS WITH ACTIVATED CARBON AS ADSORBENT AND CHLOROBENZENE AS DESORBENT

Timothy J. Barder, Addison, Ill., assignor to UOP, Des Plaines, Ill.

Filed Dec. 11, 1987, Ser. No. 131,611
The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.
Int. Cl.[4] B01D *15/00*
U.S. Cl. 210—674 14 Claims



1. A process for separating sterols from a tall oil feed mixture, which process comprises contacting at adsorption conditions said mixture with an adsorbent comprising an activated-type carbon sieve, selectively adsorbing said sterols onto said adsorbent, and treating said adsorbent containing said sterols with a desorbent material comprising an aromatic liquid hydrocarbon to desorb said sterols therefrom as a fluid extract stream.

4,882,066

DECONTAMINATION OF CONTAMINATED STREAMS

Ralph J. Portier, Baton Rouge, La., assignor to Louisiana State University, Baton Rouge, La.

Division of Ser. No. 3,019, Jan. 13, 1987, Pat. No. 4,775,650, which is a continuation-in-part of Ser. No. 918,840, Oct. 14, 1986. This application Jul. 18, 1988, Ser. No. 220,470
Int. Cl.[4] B01D *15/00*
U.S. Cl. 210—679 10 Claims

1. A process for the decontamination and removal of a metal from a metal-contaminated liquid stream which comprises

contacting said metal-contaminated liquid stream with a porous solid substrate on which chitin is dispersed as a film of thickness sufficient to complex with and remove metal from said metal-contaminated liquid stream.

4,882,067

PROCESS FOR THE CHEMICAL BONDING OF HEAVY METALS FROM SLUDGE IN THE SILICATE STRUCTURE OF CLAYS AND SHALES AND THE MANUFACTURE OF BUILDING AND CONSTRUCTION MATERIALS THEREWITH

Barrett Johnson, Sunnyvale, and Charles B. Rubenstein, Los Gatos, both of Calif., assignors to Ceramic Bonding, Inc., Mountain View, Calif.

Filed Apr. 27, 1988, Ser. No. 186,562
Int. Cl.[4] B01D *15/00*; C02F *1/28*
U.S. Cl. 210—688 14 Claims

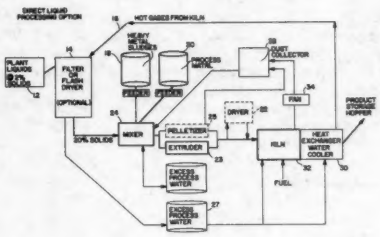
1. A process for removing contaminants from hazardous liquid waste containing heavy metal cations comprising the steps of:

providing natural clay or shale capable of adsorbing metal cations;

reducing said clay or shale to finely divided particles with high specific surface area to enhance adsorption of metal cations;

providing liquid waste having a solid content of less than 1% to 100% solids, said liquid waste containing said heavy metal cations;

mixing said liquid waste and said clay or shale together in a predetermined concentration of between 1:1 to 40:1 parts clay or shale to liquid waste;



extruding or pelletizing said mixed materials into nodules;

drying said mixed material and sintering in a kiln or calciner at a temperature in the range of 1500° Fahrenheit to 2700° Fahrenheit for at least 5 minutes;

cooling said sintered material; and

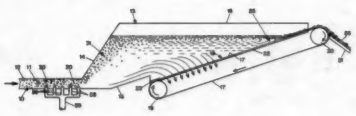
incorporating said sintered material in construction materials selected from the group consisting of bricks, cinder blocks, and concrete aggregate.

4,882,068

METHOD AND APPARATUS FOR REMOVING LIQUID FROM SUSPENSIONS

Kari B. Blom, Fort Lauderdale, Fla., assignor to Parkson Corporation, Fort Lauderdale, Fla.

Filed May 2, 1988, Ser. No. 189,139
Int. Cl.[4] B01D *21/02*
U.S. Cl. 210—703 11 Claims



1. A method for removing liquid from a suspension comprising supplying suspension to a tank through an inlet region, providing an external tank wall including a movable porous member in communication with the liquid in the tank to permit liquid from the suspension in the tank to pass out of the tank through the porous member and to carry solid material from the suspension out of the tank, and producing bubbles near the bottom of the inlet region to separate solid particles from liquid passing through the lower portion of the porous member, thereby preventing blockage of the porous member.

4,882,069

METHOD FOR THE TREATMENT OF SEWAGE AND OTHER IMPURE WATER

Anton P. Pohoreski, Saskatoon, Canada, assignor to Continental Manufacturing & Sales Inc., Saskatchewan, Canada

Continuation of Ser. No. 892,831, Aug. 4, 1986, abandoned, which is a continuation-in-part of Ser. No. 753,550, Jul. 10, 1985, Pat. No. 4,724,085, which is a division of Ser. No. 621,236, Jun. 15, 1984, Pat. No. 4,576,714. This application Aug. 5, 1988, Ser. No. 228,872

Int. Cl.[4] C02F *1/56*

U.S. Cl. 210—713 31 Claims

1. A method for the treatment of sewage or other impure water which comprises:

(1) adding and with intimate mixing to said sewage or other impure water in a mixing zone components:

(a) an inorganic coagulant which comprises an aluminum salt or an iron salt in an amount of from about 10 to 300 ppm parts by weight,

(b) an anionic acrylamide polymer polyectrolyte in an amount of from about 0.1–10 ppm parts by weight, and

(c) a cationic amine or acrylamide polymer polyelectrolyte in an amount of from about 0.1–10 ppm parts by weights,

wherein all three components are individually mixed but no more than two of said components are premixed together;

with the proviso that

said inorganic coagulant either alone or with the anionic polyelectrolyte or the cationic polyelectrolyte cannot be added last; and

said anionic polyelectrolyte and said cationic polyelectrolyte cannot be intimately mixed and added together,

thereby to provide a chemically-treated liquid effluent having large, compact, firmly-bonded, substantially-shear resistant and rapidly-separable flocs therein;

(2) separating the flocs from the chemically-treated liquid effluent in a separating zone; and

(3) removing said chemically-treated liquid effluent from the separating zone.

4,882,070

WASTE WATER CLARIFICATION

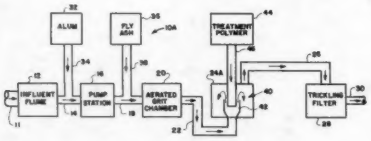
Harry H. Wardell, New Port Richey, Fla., assignor to Delichem, Inc., New Port Richey, Fla.

Continuation of Ser. No. 399,951, Aug. 25, 1986, Pat. No. 4,761,239, which is a continuation-in-part of Ser. No. 850,238, Apr. 10, 1986, abandoned. This application Mar. 22, 1988, Ser. No. 171,658

The portion of the term of this patent subsequent to Aug. 2, 2005, has been disclaimed.

Int. Cl.[4] C02F *1/56*

U.S. Cl. 210—727 11 Claims



1. A method of initiating a process for increasing the efficacy of a primary clarifier by removing about 80 to 90%, or more, of the suspended solids present in the raw waste water effluent and reducing the biological oxygen demand to below about 30 ml/l comprising:

adding to the raw waste water upstream from the primary clarifier a sufficient amount of a water soluble salt of bi- or tri-valent metal selected from the group consisting of: aluminum, iron or copper, mixtures or compositions thereof, until flocculing begins;

adding a sufficient amount of a water soluble cationic, surface active polymeric polyether amine compound comprising the reaction product of (a) of a primary amine containing compound having a plurality of primary amino groups selected from the group consisting of: ethylene diamine, tetramethylene diamine, 1, 2 propylene diamine, 1, 3 propylene diamine, diethylene triamine, triethyleneamine tetramine, and tetraethylene pentamine or mixtures thereof; and (b) a reactant selected from the group consisting of:

(1) an epihalohydrin, an epihalohydrin oligomer, and an epihalohydrin polymer; and

(2) a halohydrin-terminated derivative of a polyol and an epihalohydrin selected from the group consisting of: epihalohydrin, an epihalohydrin oligomer and an epihalohydrin polymer, to prepare a water soluble, surface active, branched, polymeric polyether amine having a cationic charge;

to increase the sludge forming material settling rate at the primary clarifier until the water at the top of the primary clarifier is clarified to a depth of about 3 or 4 inches;

adding a sufficient amount of fly-ash to increase the dry solids content of the waste water by about 10–50% at a point downstream from the salt feed point and upstream from the amine feed point until the concentration of sludge increases while the clarity of the water in the primary clarifier is maintained;

allowing the sludge forming material to settle in the primary clarifier; and

recovering the reduced suspended solid and reduced biological oxygen demanding clarified waste water effluent from the primary clarifier.

4,882,071

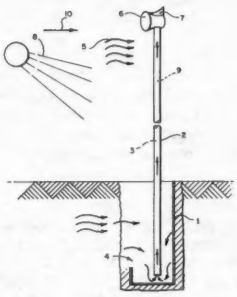
METHOD AND APPARATUS FOR THE IN SITU DECONTAMINATION OF UNDERGROUND WATER WITH THE AID OF SOLAR ENERGY

Thomas R. Bench, Pittsburgh, and Larry D. McCann, Elizabeth, both of Pa., assignors to The United States of America as represented by The Department of Energy, Washington, D.C.

Filed Jan. 21, 1988, Ser. No. 146,638

Int. Cl.[4] F24J *3/02;* B01D *1/22*

U.S. Cl. 210—747 19 Claims



1. A method for the in situ decontamination of underground water containing non-volatile contaminants with the aid of the solar energy, said method comprising

continuously contacting in situ underground water containing non-volatile contaminants with a water-absorbent material possessing high capillary activity;

allowing the non-volatile contaminants to deposit in the absorbent material while the water moves upwardly through the material by capillary action;

allowing substantially decontaminated water to be volatilized by impinging solar radiation; and then

allowing the volatilized water to escape from the material into the atmosphere.

11. An apparatus for the in situ decontamination of underground water containing non-volatile contaminants with the aid of solar energy, said apparatus comprising

at least one water-impermeable elongated conduit having an upper portion and first and second open ends and containing a homogeneous water-absorbent material possessing high capillary action, said material being in contact with the groundwater;

means for supporting said conduit; and

means for accelerating the escape of the volatilized decontaminated water from the material, said means including means for increasing the speed of the atmospheric air in the vicinity of the second end of the elongated conduit, wherein when underground water contaminated with non-volatile contaminants is continuously contacted in situ with the material contained in the first end of the conduit and the second end of the conduit is placed in contact with atmospheric air, non-volatile contaminants deposit in said material as the water moves upwardly through the material by capillary action, is then volatilized by impinging solar radiation and escapes to the atmosphere.

4,882,072
METHOD AND APPARATUS FOR TREATING BODIES OF WATER

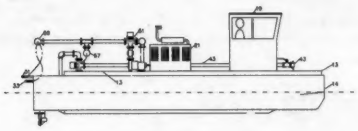
Thomas E. Eberhardt, 220 Blenheim Dr., Easton, Pa. 18042

Division of Ser. No. 199,314, May 26, 1988, Pat. No. 4,818,416, which is a continuation-in-part of Ser. No. 75,114, Jul. 20, 1987, Pat. No. 4,747,958. This application Jan. 3, 1989, Ser. No. 293,140

The portion of the term of this patent subsequent to May 31, 2005, has been disclaimed.

Int. Cl.[4] B01D *21/01*

U.S. Cl. 210—752 **34 Claims**



1. A method comprising: treating an aquatic environment to redress a predetermined constituent imbalance by dispensing to said environment a fluent treatment agent by:

(a) directing a floating means across the surface of said body of water, said floating means having associated therewith transversely extended fluent material dispensing means and feed means for said dispensing means,

(b) determining the velocity of movement of such floating means,

(c) substantially continuously determining the depth of water under the floating means by on-board depth detection means,

(d) substantially continuously processing the velocity and depth data to determine the volume of water over which the floating means and associated fluent material dispensing means passes,

(e) adjusting the feed means to said fluent material dispensing means to dispense a predetermined amount of at least one fluent treatment agent into said body of water proportionally related to the volume of water over which the floating means passes to correct such imbalance.

24. Apparatus comprising: a means for providing precise dispensing of a fluent treatment agent to a body of water having a predetermined constituent imbalance, including:

(a) a directable floating means adapted for flotation in said body of water,

(b) associated transversely extended fluent material dispensing means for dispensing a treating agent into said body of water,

(c) means to propel said floating means over said water,

(d) means to determine:

(i) the velocity of said floating means across the body of water

(ii) the depth of said body of water under said floating means,

(e) means to control discharge of fluent treatment agent from said dispensing means proportionally related to:

(i) the velocity of said floating means, and

(ii) the depth of said body of water under the floating means for correcting said imbalance.

31. Apparatus comprising: a means for providing precise dispensing of at least one fluent treatment agent to a body of water having a predetermined constituent imbalance and to the bottom of said body of water including:

(a) a directable floating means adapted for flotation in said body of water,

(b) associated transversely extended fluent material dispensing means for dispensing a treating agent into said body of water,

(c) means to propel said floating means over said water,

(d) a plurality of detection means, including at least two depth detection means to determine:

(i) data regarding the velocity of said floating means across the body of water

(ii) data regarding the depth of said body of water under said floating means at least at two transversely and longitudinally spaced points,

(e) means to substantially continuously process the velocity and depth data to determine the slope of the bottom from the depth detected under each depth detection means at any given time and to determine from such slope substantially the actual bottom surface area over which the floating means and associated fluent material dispensing means passes,

(f) means to control discharge of fluent treatment agent from said dispensing means proportionally related to:

(i) the velocity of said floating means,

(ii) the depth of said body of water under the floating means, and

(iii) the actual surface area of the bottom over which the floating means passes taking into account any substantial slope of the bottom, to correct such predetermined constituent imbalance.

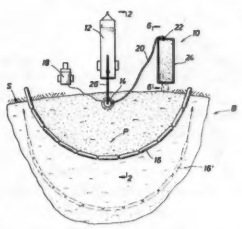
4,882,073
METHOD AND SYSTEM FOR RECOVERY OF PLASTICS FROM A SETTLING BASIN

Kenneth L. Griffith, Dickinson, Tex., assignor to T.D.K. Plastics, Inc., Dickinson, Tex.

Filed May 27, 1988, Ser. No. 199,852

Int. Cl.[4] B01D *29/04*

U.S. Cl. 210—776 **4 Claims**



1. Method for recovery of plastic material floating near the

surface of a body of water in a settling basin, said basin being defined by a surrounding shoreline, comprising the steps of:

transporting a trailer having a support member to the shoreline adjacent to a defined pump area of a basin so that one end of the support member extends over the water in the basin;

suspending a pumping means from the support member;

positioning a first end of a plastic material moving flexible floating boom means at a first location on the shoreline;

positioning a second end of the flexible floating boom means at a second location on the shoreline;

moving one or both ends of the floating boom means along the shoreline to concentrate the floating plastic material in the defined pumping area in the basin, said pumping area being defined by the portion of the shoreline between the first and second ends of the floating boom means, and the floating boom means;

positioning the inlet of the pumping means so that the upper most edge of an intake base means of the pumping means is greater than two inches below the surface of the water in the basin;

pumping a portion of the water and the floating plastic material from within the pumping area to a transportable container positioned on the shoreline of the basin; and

retaining the plastic material in the transportable container while allowing the water to pass through a screen in the container to return to the basin.

4,882,074

WASH-SOFTENER CONTAINING AMINE ON A CRYSTAL-GROWTH-MODIFIED CARBONATE CARRIER

Ian R. Kenyon, Merseyside, United Kingdom; Peter J. Russell, Yokohama, Japan, and Thomas Taylor, Cheshire, United Kingdom, assignors to Lever Brothers Company, New York, N.Y.

Filed Apr. 29, 1988, Ser. No. 187,758

Claims priority, application United Kingdom, Apr. 30, 1987, 8710292

Int. Cl.[4] D06M *13/38*; C11D *3/10, 11/02, 17/06*

U.S. Cl. 252—8.8 **12 Claims**

2. A composition for softening textile fabrics in the wash, comprising:

(a) from 5 to 30% by weight of a primary, secondary or tertiary amine capable of softening fabrics, sorbed onto

(b) from 70 to 95% by weight of a particulate carrier comprising needle-shaped crystals of a porous crystal-growth-modified carbonate-based salt selected from the group consisting of hydrated carbonate/bicarbonate double salt, anhydrous carbonate/sulfate double salt and sodium carbonate monohydrate, wherein-carbonate-based said salt incorporates at least 0.1%, calculated on the total amount of carbonate, sulfate and bicarbonate, of a crystal-growth-modifier selected from the group consisting of homopolymers and copolymers of acrylic acid and maleic acid, and said salt has a pore size distribution of at least 300 cm^3 of pores <3.5 μm per kg of carrier before absorption of said amine thereon.

9. A process for the preparation of a composition as claimed in claim 2, which comprises:

(i) preparing an aqueous slurry comprising a carrier forming material selected from the group consisting of sodium carbonate, sodium sulphate, sodium bicarbonate, and mixtures thereof, along with an effective amount of a crystal growth modifier selected from the group consisting of homopolymers and copolymers of acrylic acid and maleic acid, the crystal growth modifier being incorporated in the slurry not later than the sodium carbonate,

(ii) drying the aqueous slurry to form a particulate solid comprising a porous crystal-growth-modified carbonate-based carrier salt,

(iii) sorbing onto the particulate solid obtained in step (ii) a primary, secondary or tertiary amine capable of softening fabrics.

4,882,075

ACIDIC SURFACTANT SOLVENT COMPOSITION

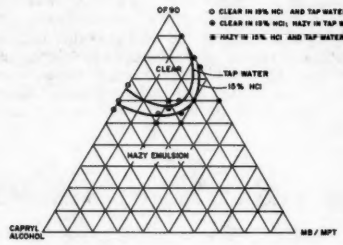
Loyd W. Jones, P.O. Box 9917, Tulsa, Okla. 74107

Continuation of Ser. No. 808,219, Dec. 12, 1985, Pat. No. 4,738,789, which is a continuation of Ser. No. 505,790, Jun. 20, 1983, abandoned. This application Feb. 23, 1988, Ser. No. 159,381

The portion of the term of this patent subsequent to Jul. 22, 2003, has been disclaimed.

Int. Cl.[4] C23F *11/04*; E21B *43/28, 43/27*

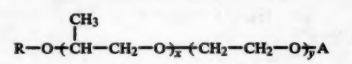
U.S. Cl. 252—8.553 **6 Claims**



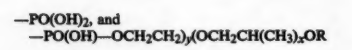
1. An improved acidic surfactant composition comprising:

(a) An aqueous acid solution;

(b) a surfactant characterized by the chemical formula:

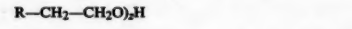


where R is an alkyl or alkyl-aryl radical of about C_6 to C_{20} carbon atoms, A is a radical selected from the group consisting of:



x is a number corresponding to the degree of propoxylation, and y is a number corresponding to the degree of ethoxylation wherein said aqueous solution is substantially acidified by an acid other than said surfactant; and

(c) an oil soluble, substantially water insoluble alcohol selected from the group consisting of a C_4 to C_{11} aliphatic alcohol and an alcohol of the formula:



Where R is an alkyl substituted phenyl group, an aliphatic alcohol residue of up to 20 carbons or a fatty acid residue of 10 to 20 carbons, a polypropylene oxide chain or polybutylene oxide chain and z is an integer from about 2 to 8, wherein the relative quantity of said alcohol present is selected such that the molar ratio of said alcohol to said surfactant is essentially a linear function of the acidity starting at a molar ratio substantially equal to the average number of ether oxygens bonded to the propylene oxide units of said surfactant at low acidity of substantially zero weight percent acid and increasing essentially linearly in value with increasing acidity to a molar ratio approaching a numerical value essentially equal to the total number of ether oxygens bonded to the sum of the propylene oxide units and ethylene oxide units of the surfactant molecule at high acidity; and

(d) an oil solvent selected from the group consisting of aromatic hydrocarbons, alkyl substituted aromatic hydro-

carbons, aromatic acid esters, alkyl substituted aromatic acid esters, ketones, terpenes, C_3 to C_{20} aliphatic hydrocarbons, polypropylene glycol, sulfolane, carbon disulfide, and mixtures thereof.

4,882,076

FABRIC SOFTENING AND ANTISTATIC PARTICULATE WASH CYCLE LAUNDRY ADDITIVE CONTAINING CATIONIC/ANIONIC SURFACTANT COMPLEX ON BENTONITE

Ronald D. Kern, Buttzville, N.J., assignor to Colgate-Palmolive Co., Piscataway, N.J.

Continuation of Ser. No. 916,068, Oct. 6, 1986, Pat. No. 4,786,422. This application Oct. 4, 1988, Ser. No. 253,012 The portion of the term of this patent subsequent to Nov. 22, 2005, has been disclaimed.

Int. Cl.[4] D06M *13/44*

U.S. Cl. 252—8.8 **18 Claims**

1. A fabric softening and antistatic particulate wash cycle additive, for use in conjunction with anionic detergent(s) in wash waters of automatic washing machines, to wash, soften and render antistatic laundry washed in such machines and subsequently dried in an automatic laundry dryer, which comprises about 10 parts by weight of a complex of a cationic surfactant and an anionic surfactant, in which complex the molar proportion of cationic to anionic moieties is in the range of about 1:1 to 1:1.5, and 1 to 80 parts by weight of bentonite.

4,882,077

METALWORKING FLUID

Charles K. Cox, Lansing, Ill., assignor to W. R. Grace & Co.-Conn., Lexington, Mass.

Filed Mar. 9, 1988, Ser. No. 165,853

Int. Cl.[4] C10M *173/00*; B21B *45/02*

U.S. Cl. 252—49.5 **6 Claims**

1. A method of metalworking comprising the steps of:

(a.) applying to a metal surface a metalworking fluid composition comprising from about 50 to about 300 parts by weight of a paraffin oil having a normal paraffin content of at least 98% by mass, an aromatic content of less than 1% and a flash point of from about 65° to about 120° C., from about 50 to about 300 parts by weight of one or more esters, and from about 70 to about 100 parts by weight of an emulsifier having an HLB number of from about 6 to about 10; and

(b.) performing a metalworking operation on the metal surface.

4,882,078

PIEZOELECTRIC CERAMIC COMPOSITION FOR ACTUATORS

Tetsuhiko Nishimura, Machida; Swapan K. Basu, Tokyo; Yukio Chida; Yasuo Oguri, both of Tokyo, and Shoko Inoue, Yokohama, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

Filed Dec. 2, 1988, Ser. No. 279,052

Claims priority, application Japan, Dec. 4, 1987, 62-307271

Int. Cl.[4] C04B *35/49, 35/46*

U.S. Cl. 252—629 **8 Claims**

1. A piezoelectric ceramic composition for actuators, which consists essentially of a composite of perovskite compounds represented by the formula

$$Pb_{(1-x)}La_x[z\{(Zn_aMg_{(1-a)})_{\frac{1}{3}}Nb_{\frac{2}{3}}\}+(1-z)\{]Zr_yTi_{(1-y)}\}]_{(1-x/4)}O_3$$

wherein $0.03 \leqq x \leqq 0.07$, $0.50 \leqq y \leqq 0.65$, $0 < z < 0.20$, and $0 < a < 1$.

4,882,079

PIEZOELECTRIC CERAMIC MATERIALS

Masahiro Tomita, Anjo, and Eturo Yasuda, Okazaki, Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Continuation of Ser. No. 834,513, Feb. 28, 1986, abandoned, which is a continuation of Ser. No. 678,162, Dec. 4, 1984, abandoned. This application Dec. 23, 1987, Ser. No. 139,086

Claims priority, application Japan, Dec. 6, 1983, 58-231165

Int. Cl.[4] C04B *35/49*

U.S. Cl. 252—62.9 **3 Claims**

1. A piezoelectric ceramic material comprising a ternary fundamental solid solution of 0.5 to 5.0 mol% of $Pb(Y_{\frac{1}{2}}Nb_{\frac{1}{2}})O_3$, 40.0 to 50.0 mol% of $PbTiO_3$, and 45.0 to 59.5 mol% of $PbZrO_3$, in which part of the Pb in the solid solution is substituted with 10.0 to 15.0 mol% of Sr, Nb_2O_5 being further contained in the solid solution in an amount of 0.1 to 2.0 wt% of the solid solution.

4,882,080

CYCLIC-N-HYDROXYIMIDE DETERGENT ADDITIVES

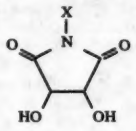
Stephen F. Donovan, Fairfield, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 84,241, Aug. 12, 1984, Pat. No. 4,792,611. This application Sep. 26, 1988, Ser. No. 249,029

Int. Cl.[4] C11D *9/30*

U.S. Cl. 252—117 **10 Claims**

1. A detergent composition comprising one or more detersive surfactants and one or more cyclic N-hydroxyimide compounds having the formula



wherein X is —OH or $-O^-M^+$, where M^+ is an alkali metal or ammonium cation.

4,882,081

COMPOSITIONS OF WATER-DISPERSED CARBOXYL-CONTAINING LIQUID POLYMERS

Carl S. Nichols, Pineville, N.C., assignor to The BF Goodrich Company, Akron, Ohio

Filed Dec. 17, 1987, Ser. No. 134,412

Int. Cl.[4] C09K *3/00*

U.S. Cl. 292—182.28 **8 Claims**

1. A water-dispersed toughening agent composition for castable elastomeric systems, said composition containing (1) 100 parts by weight of a carboxyl-containing liquid polymer, (2) at least 25 parts by weight of an organic solvent which is both water and organic soluble and has a normal boiling point above about 100° C., (3) at least about 0.8 equivalent of a base for each 1.0 carboxyl equivalent, said base having a pk_a value of greater than about 7, and (4) from about 50 to about 750 parts by weight of water.

4,882,082

NITROGEN-CONTAINING HETERCYCLIC COMPOUNDS

Rudolf Eidenschink, Kornblumenstr.; Joachim Krause, Dieburg; Reinhard Hittich, Modautal; Elke Poetsch, Muehltal; Bernhard Scheuble, Alsbach; Georg Weber, Erzhausen, and Ludwig Pohl, Darmstadt, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft Mit Beschränkter Haftung, Darmstadt, Fed. Rep. of Germany

Division of Ser. No. 884,349, Jul. 11, 1986, Pat. No. 4,752,414, which is a continuation-in-part of Ser. No. 699,054, Feb. 7, 1985, abandoned. This application Mar. 23, 1988, Ser. No. 172,424

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1984, 3404116

Int. Cl.[4] G02F *1/13*; C09K *19/34*; C07D *239/02*

U.S. Cl. 252—299.61 **6 Claims**

1. In a liquid crystalline phase comprising at least two liquid crystalline compounds, the improvement wherein at least one compound is of the formula 1aa

$$R^1—Cy—Pyr—R^2 \qquad 1aa$$

wherein

R^1 is straight chain alkyl with 1–15 C atoms,

R^2 is straight chain alkyl with 1–15 C atoms,

wherein one or two nonadjacent CH_2 groups are replaced by —O—,

Cy is a 1,4-cyclohexylene group and

Pyr is a pyrimidine-2,5-diyl group.

4,882,083

SMECTIC LIQUID CRYSTAL MIXTURE

Kanetsugu Terashima; Mitsuyoshi Ichihashi; Fusayuki Takeshita, all of Ichiharashi; Makoto Kikuchi, Kisarazushi, and Kenji Furukawa, Yokosukashi, all of Japan, assignors to Chisso Corporation, Japan

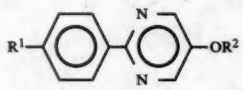
Filed May 27, 1988, Ser. No. 200,016

Claims priority, application Japan, Jun. 1, 1987, 62-137883

Int. Cl.[4] C09K *19/34*; G02F *1/13*

U.S. Cl. 252—299.61 **15 Claims**

1. A smectic C liquid crystal mixture comprising at least two components at least one of which is a 5-alkoxy-2-(4-alkylphenyl)pyrimidine compound expressed by the formula



(I)

wherein R^1 represents a linear alkyl group of 4 to 20 carbon atoms and R^2 represents a linear alkyl group of 7 to 20 carbon atoms, and having a smectic C phase.

4,882,084

OPTICALLY ACTIVE SUBSTITUTED BIPHENYL COMPOUNDS

Kouji Ohno; Shinichi Saito; Kazutoshi Miyazawa, all of Yokohama; Makoto Ushioda, Kawasaki; Hiromichi Inoue, and Naoyuki Yoshida, both of Yokohama, all of Japan, assignors to Chisso Corporation, Osaka, Japan

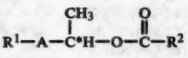
Filed Oct. 28, 1987, Ser. No. 113,763

Claims priority, application Japan, Nov. 7, 1986, 61-263837; Nov. 17, 1986, 61-273589

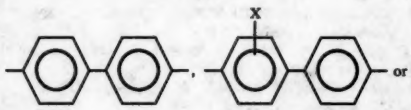
Int. Cl.[4] C09K *19/12, 19/52*; G02F *1/13*; C07C *67/02*

U.S. Cl. 252—299.66 **5 Claims**

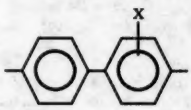
4. A ferroelectric liquid crystal mixture comprising at least one smectic liquid crystal compound and at least one optically active compound of the general formula:



wherein R^1 is an alkyl or alkyloxy group having a carbon number of 1–18, R^2 is an alkyl group having a carbon number of 1–18, a is



or



and X is a halogen atom or a cyano group.

4,882,085

LACTIC ACID DERIVATIVE AND LIQUID CRYSTAL COMPOSITION CONTAINING SAME

Kazuo Yoshinaga, Machida; Kazuharu Katagiri, Tama; Akira Tsuboyama; Hiroyuki Kitayama, both of Tokyo; Kenji Shinjo, Yokohama, and Chieko Hioki, Hiratsuka, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

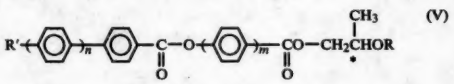
Continuation of Ser. No. 893,821, Aug. 6, 1986, abandoned. This application Dec. 28, 1988, Ser. No. 291,325

Claims priority, application Japan, Aug. 13, 1985, 60-176938; Nov. 7, 1985, 60-247994; Dec. 28, 1985, 60-299003; Jul. 25, 1986, 61-173921

Int. Cl.[4] C09K *19/12, 19/34, 19/20*; G02F *1/13*

U.S. Cl. 252—299.61 **20 Claims**

1. An optically active lactic acid derivative represented by the following formula (V):



(V)

wherein R represents a linear, saturated hydrocarbon group having 1 to 18 carbon atoms; C* represents an asymmetric carbon atom; R' represents a linear alkyl group or alkoxy group having 5 to 16 carbon atoms; m is 1 or 2; n is 0 or 1 and m+n=1 or 2.

4,882,086

FERROELECTRIC LIQUID CRYSTAL COMPOSITION

Kanetsugu Terashima; Mitsuyoshi Ichihashi, both of Ichiharashi; Makoto Kikuchi, Kisarazushi; Fusayuki Takeshita, Ichiharashi, and Kenji Furukawa, Yokosukashi, all of Japan, assignors to Chisso Corporation, Osaka, Japan

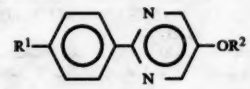
Filed Jan. 19, 1989, Ser. No. 298,989

Claims priority, application Japan, Feb. 9, 1988, 63-27940

Int. Cl.[4] C09K *19/34*; G02F *1/13*

U.S. Cl. 252—299.61 **4 Claims**

1. A ferroelectric liquid crystal composition having a cholesteric comprising an achiral compound expressed by the formula



(I)

wherein R^1 and R^2 each represent the same or different linear or branched chain alkyl group of 1 to 18 carbon atoms, in 20 to 70% by weight, and an optically active compound causing a cholestric phase to appear.

4,882,087

AQUEOUS DISPERSED SOLUTION OF SUBSTITUTED SUCCINIC ANHYDRIDE AND PROCESS FOR PRODUCING THE SAME

Shigehiko Yoshioka; Hideto Yamada, both of Akashi; Hisatake Sato, Yokohama, and Motokazu Kamei, Nagaoka, all of Japan, assignors to Seiko Kagaku Kogyo Co., Ltd., Hyogo; Nippon Co., Ltd., Tokyo and Hokuetsu Paper Mills, Ltd., Niigata, all of, Japan

Continuation of Ser. No. 779,125, Sep. 23, 1985, abandoned. This application Jun. 30, 1988, Ser. No. 213,476

Claims priority, application Japan, Sep. 25, 1984, 59-200276

Int. Cl.[4] B01J *13/00*; C08L *91/00*; D21H *3/10*

U.S. Cl. 252—312 4 Claims

1. An aqueous dispersed solution of a substituted succinic anhydride comprising:

i. an aqueous soluble copolymer having as monomer ingredients at least 50% by mol (meth) acrylamide, at least 1% by mol N,N-dialkylamino alkyl(meth)acrylamide, and 0 to 49% by mol of other copolymer monomers; and

ii. a polyoxyalkylene alkyl(aryl)ether phosphoric acid ester.

3. A process for producing an aqueous dispersed solution of a substituted succinic anhydride comprising:

mixing the substituted succinic anhydride and a polyoxyalkylene alkyl(aryl)ether phosphoric acid ester to produce a mixture; and then

dispersing the mixture in an aqueous solution containing an aqueous soluble copolymer having as monomer ingredients at least 50% by mol (meth)acrylamide, at least 1% by mol N,N-dialkylamino alkyl(meth)acrylamide, and 0 to 49% by mol of other copolymer monomers, to produce the aqueous dispersed solution.

4,882,088

SLURRY FOR CENTRIFUGAL CLASSIFICATION OF COLLOIDAL PARTICLES

Bruce E. Novich, Lexington, Mass., assignor to Ceramics Process Systems Corp., Milford, Mass.

Continuation-in-part of Ser. No. 28,891, Mar. 23, 1987, Pat. No. 4,781,671. This application Apr. 9, 1987, Ser. No. 36,325

Int. Cl.[4] B01J *13/00*; C08J *3/22*; C09C *1/40*

U.S. Cl. 252—313.1 6 Claims

1. A slurry for the centrifugal classification of colloidal particles, comprising:

(a) particulate, non-clay, ceramic colloidal particles: and

(b) a dispersant present in substantial excess of that amount necessary for dispersion of the particles and in an amount effective to result in a plastic cake of classified particles when the slurry is centrifugally classified.

4,882,089

COMPOSITIONS CONVERTIBLE TO REINFORCED CONDUCTIVE COMPONENTS AND ARTICLES INCORPORATING SAME

Richard S. Iwaskow, Passaic, and Stephen M. Crum, Wharton, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 358,549, Mar. 16, 1982, Pat. No. 4,752,415. This application Nov. 18, 1987, Ser. No. 122,283

Int. Cl.[4] B23B *5/16*; H01B *1/06*

U.S. Cl. 428—242 14 Claims

1. An article of manufacture comprising:

(i) a polymeric material with little or no conductivity; and

(ii) composite fibers, the majority of which have an electrically conductive non-metallic or semi-metallic core and at least one thin, uniform, firmly adherent, electrically conductive layer of at least one electrodepositable metal on said core, alone, or in combination with other fibers, the amount of component (ii) in said composition being at least effective to render said article of manufacture electrically and/or thermally conductive, and wherein said composite fibers of component (ii) are the sole electrically or thermally conductive component added to component (i), wherein said polymeric material (i) is present with a woven, knitted, or nonwoven fabric, sheet or mat comprising said composite fibers (ii) or with said composite fibers (ii) in comminuted form.

4,882,090

ELECTROPHORETICALLY OVERCOATABLE COATINGS APPLIED BY ELECTROCOATING

Wolfgang Batzill; Ulrich Heilmann; Hans J. Streitberger, all of Münster; Harald Guder, Wuppertal, and Fritz Beck, Duisburg, all of Fed. Rep. of Germany, assignors to BASF Lacke & Farben Aktiengesellschaft, Münster, Fed. Rep. of Germany

PCT No. PCT/EP86/00585, § 371 Date Aug. 17, 1987, § 102(e) Date Aug. 17, 1987, PCT Pub. No. WO87/02717, PCT Pub. Date May 7, 1987

PCT Filed Oct. 13, 1986, Ser. No. 72,269

Claims priority, application Fed. Rep. of Germany, Oct. 31, 1985, 3538792

Int. Cl.[4] H01B *1/06*

U.S. Cl. 252—511 2 Claims

1. A cathodically depositable aqueous electropaint which contains a cationic amine-modified epoxy resin and is pigmented with electroconductive carbon black and which, on deposition and crosslinking, provides an electrophoretically overcoatable coating, which contains as electroconductive carbon black a carbon black having an iodine absorption of 870–930 mg/g, a specific surface area (BET/N_2) of 850–1,000 m^2/g, a pore volume (DBP) of 330–390 ml/100 g and an average particle size of 25 to 35 nm in an amount of 1.5 to 5.1% by weight—based on total solids.

4,882,091

USE OF POLYHYDROXYALKYLAMINE-N-N-DICARBOXYLIC ACIDS AND THEIR SALTS AS BUILDERS IN DETERGENTS AND CLEANING AGENTS

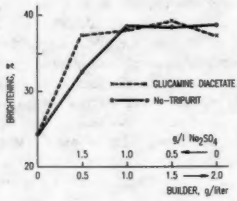
Heike Kelkenberg, Gladbeck, and Wulf Ruback, Recklinghausen, both of Fed. Rep. of Germany, assignors to Hüls Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Feb. 24, 1988, Ser. No. 159,738

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1987, 3710062

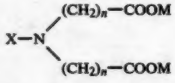
Int. Cl.[4] C11D *3/33, 1/83*

U.S. Cl. 252—527 **7 Claims**



3. A detergent or cleansing composition, comprising:

a combination of at least one anionic or nonionic surfactant with from 2–60 wt.%, based on the weight of the composition, of a builder consisting of a polyhydroxyalkylamine-N,N-dialkylcarboxylic acid or a salt thereof of the formula:



wherein X is a group containing a polyhydroxyalkyl group of 3 to 7 carbon atoms glycosidically bonded to a mono-, di- or oligosaccharide, M is hydrogen, ammonium or an alkali metal ion and n is an integer of from 1 to 3.

4,882,092

METHOD OF MAKING RADIATION SHIELDING ELEMENTS FOR USE IN NUCLEAR TECHNOLOGY

Manfred Sappok, Tonisvorst, Fed. Rep. of Germany, assignor to Siempelkamp Giesserei GmbH & Co., Krefeld, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 113,338, Oct. 22, 1987, Pat. No. 4,767,572, which is a continuation of Ser. No. 840,423, Mar. 17, 1986, abandoned. This application Jun. 3, 1988, Ser. No. 202,793

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1985, 3527319

The portion of the term of this patent subsequent to Aug. 30, 2005, has been disclaimed.

Int. Cl.[4] G21F *9/16, 5/00;* G21C *19/00, 9/00*

U.S. Cl. 252—628 **12 Claims**

1. A method of making a radiation shielding structure for a nuclear installation which comprises the steps of:

(a) deriving a radioactive residue having a cobalt 60 equivalent specific activity below 100 Bq/g from parts of a former nuclear reactor installation;

(b) incorporating said radioactive residue in a composition; and

(c) forming said composition into a radiation shielding solid structure.

4,882,093

PROCESS AND INSTALLATION FOR THE TREATMENT OF SOLID ORGANIC WASTE CONTAMINATED BY TRITIUM

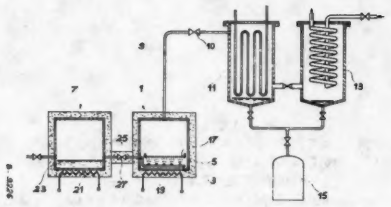
Pierre Giroux; Dominique Ochem, and Jean-Claude Durand, all of Dijon, France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Sep. 8, 1988, Ser. No. 241,622

Claims priority, application France, Sep. 9, 1987, 87 12510

Int. Cl.[4] G21F *9/02, 9/08, 9/14;* C01B *5/00*

U.S. Cl. 252—632 **9 Claims**



1. Process for the treatment of solid organic waste contaminated with tritium, comprising the steps of:

contacting said waste with steam under conditions such that steam extraction of at least part of the tritium present in the waste occurs, and

condensing said steam to convert the tritium from the waste to tritiated water.

4,882,094

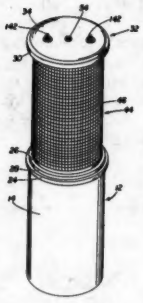
SEPARATION SYSTEM FOR DEWATERING RADIOACTIVE WASTE MATERIALS

Leslie S. Rubin, Newton, and Hans A. Hug, Weston, both of Mass., assignors to Foster-Miller, Inc., Waltham, Mass.

Filed Feb. 26, 1988, Ser. No. 160,920

Int. Cl.[4] G21F *9/12, 9/24;* B04B *11/02, 5/10*

U.S. Cl. 252—633 **30 Claims**



21. A separation system for dewatering radioactive waste materials comprising

disposal container structure for use in disposal of radioactive materials comprising

inner container structure that includes filter structure defining a chamber volume of at least about five cubic feet, said filter structure including circumferential foraminous wall structure with filtering characteristics to retain solid material while passing liquid material, and lid structure secured to said filter structure, said lid structure including means defining an inlet port, and first annular seal structure of thermoplastic material at the periphery of said lid structure; and

outer container structure including base and side wall portions that conform essentially to and for receiving said filter structure of said inner container structure, and

second annular seal surface of thermoplastic material adjacent the top of said side wall structure for juxtaposition with said first annular seal surface,

said first and second annular seal surfaces having a first configuration providing liquid flow paths for flow of liquids from the chamber volume defined by said filter structure through said filter structure for flow externally of said container structure under the influence of centrifugal force, and a second configuration in which said seal surfaces are in sealing engagement to provide a sealed high integrity disposal container;

drive structure for receiving said container structure, said drive structure including drain passage structure for alignment with said liquid flow paths provided by said first and second seal surfaces for liquid passed through said filter structure under the influence of centrifugal force,

means for driving said drive structure in rotation to subject to said container to centrifugal forces in excess of fifty Gs, and

means for releasably attaching said container structure to said drive structure.

4,882,095

PREPARATION OF ALKOXY(ISO)VIOLANTHRENEDIONES

Reinhard Helwig, Gruenstadt, and Helmut Hoch, Weisenheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Sep. 19, 1988, Ser. No. 246,312

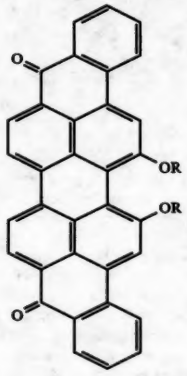
Claims priority, application Fed. Rep. of Germany, Sep. 22, 1987, 3731809

Int. Cl.[4] C07C *3/22*

U.S. Cl. 552—279 **16 Claims**

1. A process for the preparation of a bisalkoxyviolanthrenediene or bisalkoxyisoviolanthrenedione of the formula

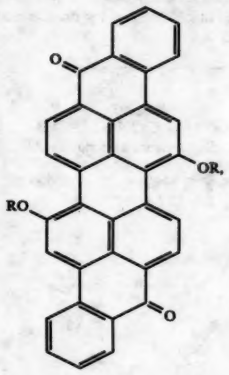
(I)



or

-continued

(II)



where R is C_1–C_4-alkyl, which comprises alkylating the corresponding bishydroxyl compound (R=H) in methyl benzoate as the reaction medium in the presence of an alkali metal salt of a weak acid and a tertiary aliphatic or tertiary aromatic amine, or a mixture of tertiary aliphatic and tertiary aromatic amines, at from 100° to 200° C.

4,882,096

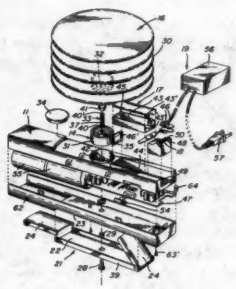
COMPACT HAND-PORTABLE HUMIDIFIER

Ronnie Rueben, c/o 555 Chabanel W., Montreal, Quebec, Canada

Filed Nov. 14, 1988, Ser. No. 270,666

Int. Cl.[4] B01F *3/04*

U.S. Cl. 261—30 **11 Claims**



1. A compact hand-portable vapor dispenser device comprising a miniature support housing capable of being carried in an article of luggage, said support housing being an elongated substantially rectangular housing having a reservoir connector on a top wall thereof for connecting to a reservoir, valve means for dispensing water from said reservoir to a vaporizing chamber provided in said housing, an ultrasonic vibrating means in said vaporizing chamber for producing and releasing water particles, said vaporizing chamber having a nozzle through which said water particles are ejected into the atmosphere, transducer circuit means for driving said vibrating means, a fan in said housing to provide air under pressure to said vaporizing chamber and in communication with said vibrating means for releasing water vapors through said nozzle, a collapsible support frame secured to said housing and collapsible from a position of use where said frame supports said

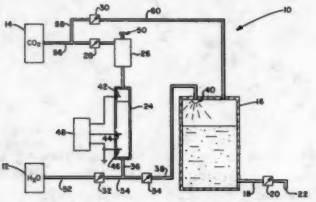
reservoir to a storage position where said frame is integrated with said housing, and a power supply connected to an electronic circuit located in said housing for driving said ultrasonic vibrating means and fan.

4,882,097

CARBONATION SYSTEM

Joseph W. Shannon, Kent, Ohio, assignor to ABC/Sebra Tech Corp., Mogadore, Ohio

Filed Sep. 6, 1988, Ser. No. 240,690
Int. Cl.[4] B01F *3/04*
U.S. Cl. 261—35 **20 Claims**



1. A carbonation system for generating soda, comprising:
a source of carbon dioxide maintained under pressure;
a source of water;
a reservoir in communication with said source of carbon dioxide and said source of water, said reservoir receiving a volume of water from said source of water and a first pressure head of carbon dioxide gas from said source of carbon dioxide; and
a carbonation tank in communication with said source of carbon dioxide and said reservoir, said carbonation tank receiving a second pressure head of carbon dioxide gas from said source of carbon dioxide and a flow of water from said reservoir, said flow of water increasing said second pressure head of said carbonation tank until said second pressure head equals said first pressure head, terminating said flow of water.

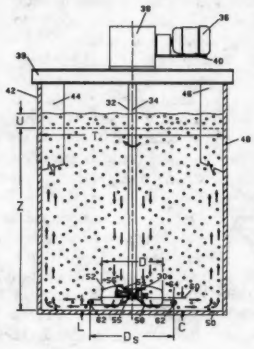
4,882,098

MASS TRANSFER MIXING SYSTEM ESPECIALLY FOR GAS DISPERSION IN LIQUIDS OR LIQUID SUSPENSIONS

Ronald J. Weetman, Rochester, N.Y., assignor to General Signal Corporation, Rochester, N.Y.

Filed Jun. 20, 1988, Ser. No. 209,158
Int. Cl.[4] B01F *3/04*
U.S. Cl. 261—93 **18 Claims**

1. A mixing system for dispersing a fluid into a liquid which can have solids suspended therein which comprises a tank having a bottom and side walls which extend axially of said tank, said tank containing the liquid to a level above the bottom of said tank, a drive to turn an impeller, impeller means for providing a recirculating, axial flow pattern having principally axial flow components upwardly and downwardly between the bottom of the tank and the level of the liquid therein and a radial flow component in the direction across the bottom of said tank toward the side walls thereof, the outlet flow from said impeller means being a predominately axial flow downwardly towards the bottom of said tank and a predominately radial flow towards the side walls of said tank, means for releasing said fluid in said outlet flow outside where said flow is axial and in said radial flow which is inside where said flow is radial, whereby said fluid is unable to oppose said axial outward flow, said releasing means being in a region of said tank which extends between the bottom of said tank and a



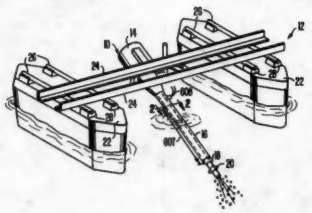
plane through said impeller means which plane is perpendicular to the axial direction.

4,882,099

AERATION APPARATUS HAVINE A DEICING MECHANISM AND CONTROL CIRCUIT THEREFOR

Joseph A. Durda, Wazatta, and Thomas G. Giese, Edina, both of Minn., assignors to Aeration Industries, Inc., Chaska, Minn.

Filed Nov. 23, 1988, Ser. No. 275,522
Int. Cl.[4] B01F *3/04*
U.S. Cl. 261—128 **27 Claims**



1. An aspirator aerator for inducing the flow of atmospheric air at high velocity below the surface of a substance so as to allow oxygen to freely and quickly transfer into the substance comprising:
an outer tubular housing having an inner rotary driven member disposed therein, one end of said housing being associated with aspiration means for inducing fluid flow through the aerator, the other end of said housing being associated with drive means for driving said rotary driven member and the aspiration means; and
deicing means disposed between said inner rotary driven member and said outer tubular housing for deicing the aerator.

4,882,100

UO2 PELLET FABRICATION PROCESS

Tadao Yato, Mito; Takeshi Onoue, Katsuta, and Hiroshi Tanaka, Omiya, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 13, 1989, Ser. No. 296,802
Claims priority, application Japan, May 25, 1988, 63-127934
Int. Cl.[4] C09K *11/04;* G21G *4/00, 43/025;* G21C *21/00*
U.S. Cl. 264—0.5 4 Claims

1. A process for fabricating UO_2 pellets having large-grained UO_2 crystals therein, which comprises:

(a) filtering and drying a slurry of ammonium diuranate containing about 0.001 to 5 wt. % of ammonium fluoride to provide a powder of said ammonium diuranate and ammonium fluoride; and

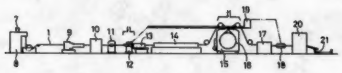
(b) subjecting said powder to calcining, reducing, compacting and sintering, to thereby form UO_2 pellets containing crystals having an average grain-size in the range of about 20 to 100 μm.

4,882,101

METHOD OF PRODUCING A REINFORCED RUBBER HOSE BY USING A PLASTIC MANDREL

Katsuhiko Ohkita; Kazuhiro Ogata, and Ken Niwa, all of Komaki, Japan, assignors to Tokai Rubber Industries, Ltd., Aichi, Japan

Filed May 26, 1988, Ser. No. 199,147
Claims priority, application Japan, May 29, 1987, 62-134364
Int. Cl.[4] B29C *33/44*
U.S. Cl. 264—26 9 Claims



1. A method of producing a reinforced rubber hose by using a plastic mandrel, comprising the steps of:

continuously extruding a long plastic mandrel from a plastic material and feeding the extruded plastic mandrel;

extruding an unvulcanized inner rubber tube on an outer surface of said long plastic mandrel;

forming a tubular reinforcing layer on an outer surface of said unvulcanized inner rubber tube;

extruding an unvulcanized outer rubber tube on an outer surface of said tubular reinforcing layer;

vulcanizing said unvulcanized inner and outer rubber tubes, thereby preparing a long rubber hose formed on said long plastic mandrel;

cutting the prepared long rubber hose into short rubber hoses having a predetermined length, and concurrently cutting said log plastic mandrel into short plastic mandrels having said predetermined length;

removing said short plastic mandrels from the respective short rubber hoses; and

crushing the removed short plastic mandrels into a starting form of said plastic material, and returning said starting form of the plastic material to an extruder for continuously extruding said long plastic mandrel, so that said short plastic mandrels are reclaimed as said plastic material.

4,882,102

PROCESS FOR PRODUCING HARD CARBONACEOUS SHEETS

Takamasa Kawakubo, Gunma; Mitsuru Yoshida, Fujioka, and Yoshihisa Suda, Maebashi, all of Japan, assignors to Mitsubishi Pencil Co., Ltd., Tokyo, Japan

Filed Nov. 2, 1987, Ser. No. 115,375
Int. Cl.[4] B05D *31/02;* C01B *31.02*
U.S. Cl. 264—29.3 3 Claims

1. A process for producing hard carbonaceous sheets, comprising:

uniformly dispersing as a viscous binder in fine carbon powder a relatively readily polymerizable thermosetting resin exhibiting high residual carbon yield after calcining to form a mixture;

applying mechanical energy to the resultant mixture to induce mechanochemical phenomenon to produce a molding paste composition in which said binder is uniformly rigidly bonded physicochemically to surfaces of the fine powder,

molding the composition by a coating method into an article having a film or sheet shape;

infusibilizing the article; and

calcining the article in an inert gas atmosphere.

4,882,103

PROCESS FOR PRODUCING CARBON PRODUCT HAVING COARSE AND DENSE STRUCTURE

Takamasa Kawakubo, Gunma; Mitsuru Yoshida, Fujioka, and Yoshihisa Suda, Maebashi, all of Japan, assignors to Mitsubishi Pencil Co., Ltd., Tokyo, Japan

Filed Nov. 9, 1987, Ser. No. 118,162
Int. Cl.[4] B05D *3/02;* C01B *31/02*
U.S. Cl. 264—29.5 8 Claims

1. A process for producing a carbon product having coarse and dense portions, the process comprising:

calcining in an inert gas atmosphere a composite of

(a) a composition of material selected from the group consisting of (1) a green molding, (2) a precarbonized material and (3) a carbide for producing a dense structure and

(b) chlorinated vinyl chloride resin particles, thereby forming an integrally shaped composite,

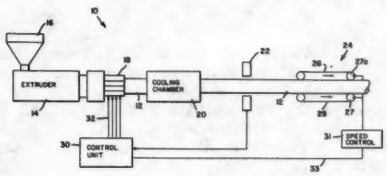
said integrally shaped composite being formed using at least one liquid composition positioned between a green molding and a precarbonized substance.

4,882,104

METHOD OF CONTROLLING THE THICKNESS OF AN EXTRUDED PLASTIC ARTICLE

Josef Dobrowsky, Tullnerbach, Austria, assignor to Cincinnati Milacron, Inc., Cincinnati, Ohio

Filed Mar. 28, 1988, Ser. No. 173,933
Claims priority, application Austria, Apr. 3, 1987, 818/87
Int. Cl.[4] B29C *47/92*
U.S. Cl. 264—40.1 11 Claims



1. A method for monitoring and controlling the wall thickness of an extruded profile of heated polymeric material that issues from an extrusion die, the die including a plurality of discrete sectors each having a temperature controllable heat

source and a temperature sensing device, said method comprising the following steps:

(a) extruding a polymeric material in an extrusion direction through an extrusion die at an extrusion speed to provide an article of predetermined cross-sectional shape from the extrusion die, the article having a periphery and a wall thickness dimension and having a longitudinal axis extending in the extrusion direction;

(b) measuring the wall thickness of the extruded article at a plurality of spaced measuring points on the periphery of the article, each of the measuring points spaced laterally outwardly of the longitudinal axis of the article, and calculating the overall average wall thickness of the extruded article from the measured wall thicknesses;

(c) providing a predetermined desired average wall thickness, a predeterined wall thickness distribution, and a predetermined wall thickness tolerance;

(d) providing data means indicative of a change in wall thickness of the article as a function of a change in the temperature of the extrusion die to permit a determination of a temperature change that is necessary to effect a desired wall thickness change;

(e) determining from the wall thickness measurements the maximum wall thickness value, the position on the article corresponding with the maximum wall thickness value, the minimum wall thickness value, and the position on the article corresponding with the minimum wall thickness value;

(f) determining from the data means the temperature change required at each sector of the die to change the measured wall thickness to correspond substantially with the calculated overall average wall thickness; and

(g) changing the temperatures of the respective heat sources at the respective extrusion die sectors to provide the desired die sector temperatures and the desired article wall thicknesses at corresponding points on the extruded article.

4,882,105

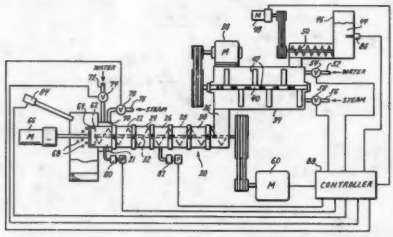
METHOD OF AUTOMATICALLY CONTROLLING AN EXTRUDER

Joseph A. Volk, Jr., Creve Coeur, Mo., assignor to Beta Raven Inc., Earth City, Mo.

Division of Ser. No. 118,434, Nov. 9, 1987, Pat. No. 4,767,301. This application Aug. 26, 1988, Ser. No. 237,159

Int. Cl.[4] B29C *47/92*

U.S. Cl. 264—40.1 **2 Claims**



1. A method of controlling an extruder as it processes organic dry material and moisture into an extrudate comprising the steps of:

sensing the temperature of the extrudate immediately as it is separated from the extruder;

sensing the pressure inside the extruder at a plurality of locations along the path of the material as it traverses the extruder;

controlling the input of material, moisture, and heat into the extruder in response to said sensed temperature and pressure in order to maintain pre-determined values of temperature and pressure to thereby maximize throughput of desirable extrudate.

4,882,106

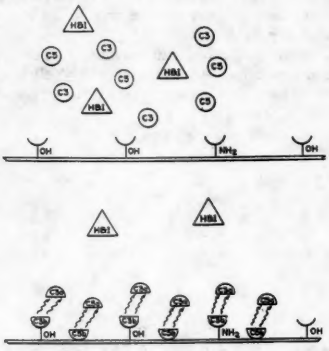
METHODS OF MANUFACTURING NUCLEOPHILIC MATERIAL MODIFIED FOR IMPROVED BIOCOMPATIBILITY

Richard J. Johnson, Mundelein; Dennis E. Chenoweth, Kildeer; Daniel R. Boggs, Vernon Hills, and Michael J. Lysaght, Barrington, all of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Continuation-in-part of Ser. No. 20,794, Feb. 27, 1987. This application Mar. 11, 1987, Ser. No. 24,652

Int. Cl.[4] B01D *13/00*

U.S. Cl. 264—41 **12 Claims**



1. A method of forming a material having nucleophilic groups into hollow fiber form while selectively modifying the surface characteristics of the material along the interior bore of the hollow fiber to prevent complement activation and bind beta 2 microglobulin, said method comprising the steps of

forming the material into a tubular shape around a lumen fluid which serves as a central core around which said fiber is formed and which fluid includes a constituent having an activated carbonyl group which reacts chemically with the material in a predetermined fashion as the fiber is being formed.

4,882,107

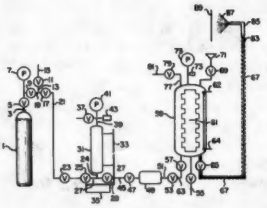
MOLD RELEASE COATING PROCESS AND APPARATUS USING A SUPERCRITICAL FLUID

Keith D. Cavender; Edmond J. Derderian, both of Charleston; Eugene L. Jarrett, St. Albans, and Kenneth A. Nielsen, Charleston, all of W. Va., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Nov. 23, 1988, Ser. No. 276,162

Int. Cl.[4] B29C *67/22, 33/58, 39/36, 45/40*

U.S. Cl. 264—51 **50 Claims**



1. A process which comprises the steps of (i) forming a release surface by spray coating an area of a solid surface with a release agent obtained from a release agent formulation containing a solution, suspension or dispersion of a release agent and a supercritical fluid, (ii) depositing a mass of material onto the release surface, and (iii) separating the mass of material or

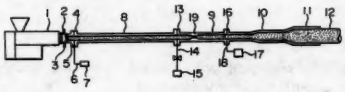
a product derived from the mass of material, from the release surface.

4,882,108

METHOD FOR PRODUCING POLYPROPYLENE FOAM

Yoshio Nakajima; Takao Kimura, and Yoshinobu Nagaoka, all of Yokkaichi, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed Apr. 7, 1988, Ser. No. 178,940
Claims priority, application Japan, Apr. 13, 1987, 62-88880
Int. Cl.[4] B29C *67/22*; C08J *9/06*
U.S. Cl. 264—54 **7 Claims**



1. A method for producing a polypropylene foamed article, comprising the steps of:

uniformly melt-mixing a polypropylene resin with a crosslinking agent and a foaming agent;

extruding the thus-obtained melted resin into a long-land die provided with a choking die in an intermediate portion thereof so as to apply back pressure to the melted resin in a front stage of said long-land die;

supplying a lubricant to an interface between said long-land die and the melted resin from a portion near an inlet of said long-land die;

heating the resin to cause crosslinking by the resin by thermal decomposition of the crosslinking agent in said front stage of said long-land die;

heating the resin to a temperature above the decomposition temperature of the foaming agent in a rear stage of said long-land die;

foaming the resin by extruding it from said long-land die, wherein said polypropylene resin is an ethylene-propylene random copolymer which contains 2 to 10 wt % of ethylene with a melt flow rate of 5 g/10 minutes or more at 230° C. and a melt expansion ratio of 1.4 or less at 190° C.;

extracting the lubricant from a surface of the resin at an end of said front stage of said long-land die; and

supplying the extracted lubricant to an interface between said long-land die and the resin at an end of the intermediate portion.

4,882,109

PROCESS OF PREPARING ZIRCONIA-COATED SILICON NITRIDE SINTERED MEMBER

Minoru Matsui, Nagoya, and Tomonori Takahashi, Chita, both of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Division of Ser. No. 112,053, Oct. 22, 1987, Pat. No. 4,816,349, which is a continuation of Ser. No. 887,654, Jul. 21, 1986, abandoned. This application Sep. 19, 1988, Ser. No. 245,680
Claims priority, application Japan, Aug. 2, 1985, 169782; Sep. 26, 1985, 213493
Int. Cl.[4] C04B *35/58*
U.S. Cl. 264—62 **5 Claims**

1. A method of producing a silicon nitride sintered member having reduced thermal conductivity, comprising:

providing a silicon nitride sintered body;

roughening or activating a surface of said body; and

providing a heat insulating layer on said surface, said layer consisting essentially of zirconia, and having a thickness of not greater than 100 microns.

4,882,110

CO_2 COPOLYMER BINDER FOR FORMING CERAMIC BODIES AND A SHAPING PROCESS USING THE SAME

Daniel P. Kramer, Macungie; Joseph G. Santangelo, and James J. Weber, both of Allentown, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jan. 27, 1987, Ser. No. 7,233
Int. Cl.[4] C04B *35/64*
U.S. Cl. 264—63 **9 Claims**

1. A method for producing a shaped ceramic body which comprises:

(a) admixing a ceramic powder with a binder comprising a polyalkylene carbonate to produce a ceramic-binder mixture;

(b) shaping the ceramic-binder mixture into a green body; and

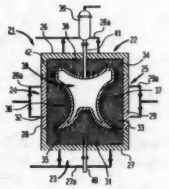
(c) sintering the green body to form the shaped ceramic body.

4,882,111

METHOD FOR OBTAINING DRAIN-CAST HOLLOW ARTICLES

Kazushige Murata, Tokoname, Japan, assignor to INAX Corporation, Aichi, Japan

Filed Aug. 4, 1986, Ser. No. 894,497
Claims priority, application Japan, Aug. 6, 1985, 60-173922
Int. Cl.[4] B28B *1/26, 7/12*
U.S. Cl. 264—87 **21 Claims**



1. A method for drain-casting a slip to very rapidly obtain a substantially hollow molded article automatically without substantial manual operations, by the use of an apparatus comprising a divisible mold including an upper mold portion, a lower mold portion, and at least two side mold portions to form a mold cavity, the mold portions being moveably supported by outer supporting members, each mold portion including a pressure-proof airtight vessel and a filter member inside the vessel, said filter member containing a water drainage means, said water-drainage means being communicated with the openings outside of the vessel, one of said lower or upper mold portion having a slip supply duct; which method comprises the steps of

filling the mold cavity with a slip supplied through the slip supply duct,

pressurizing the slip to facilitate deposition of the slip onto the filter members of the mold to a desired thickness, cohesion of the deposited slip onto the filter members being effected and water being drained from the mold,

adjusting the position of the slip supply duct downward and draining the undeposited slip remaining in the mold cavity through the slip supply duct,

thereafter in the presence of the cohesion, applying compressed air to the water-drainage means of the upper and lower mold portions to exude some water and from a water film between the filter members and the resulting hollow molded article cohered on the filter members,

removing the upper and lower mold portion in the presence of the water film, while firmly holding and supporting the cohesion without vacuum the freshly molded article between the filter members of the side mold portions in a

suspended fashion to prevent the hollow article from cracking, breaking and deforming,

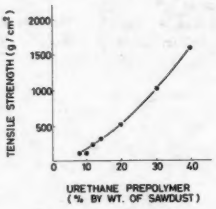
thereafter applying a receiving stand under the partly demolded article thus held and supported, removing the side mold portions by application of compressed air to the water-drainage means of the side mold portions to exude some water and form a water film between the filter members and the molded article cohered on the filter members, and demolding the molded article in the presence of the water film on the stand without deformation or damage of the molded article.

4,882,112

PROCESS FOR PRODUCING SHAPED ARTICLES FROM VEGETABLE PARTICULATE MATERIALS

Hirohisa Maki, Neyagawa, and Eiichiro Suzuki, Iwata, both of Japan, assignors to Dai-Ichi Kogyo Seiyaku Co., Ltd., Kyoto, Japan

Filed Dec. 31, 1986, Ser. No. 948,169
Int. Cl.[4] B27N *3/08*
U.S. Cl. 264—109 **10 Claims**



1. In a process for preparing sheets or other shaped articles comprising the steps of applying a binder composition to vegetable particulate materials, shaping the resulting mass, and curing the resulting shaped articles, the improvement wherein said binder composition consists essentially of an aqueous mixture of (a) at least 8% by weight of said vegetable particulate materials of a urethane prepolymer having a plurality of terminal free isocyanato groups formed by reacting an excess of a polyisocyanate with a polyalkylene polyol having at least two terminal hydroxyl groups per molecule and an oxyethylene unit content of 10 to 90% by weight; (b) an aqueous solution or emulsion of an inert binder polymer selected from the group consisting of polyvinyl acetate, ethylene vinyl acetate copolymer and ethylene vinyl acetate vinyl versatate copolymer; and (c) at least equal parts by weight of the solid content of said binder composition of water; and wherein said shaped articles are subjected to drying to reduce their water content subsequent to said curing step.

4,882,113

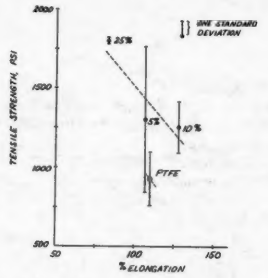
HETEROGENEOUS ELASTOMERIC COMPOSITIONS CONTAINING A FLUOROELASTOMER AND PTFE AND METHODS FOR MANUFACTURING SAID COMPOSITIONS

Roger Tu, Lake Forrest, and Wilfred F. Mathewson, Dana Point, both of Calif., assignors to Baxter International Inc., Deerfield, Ill.

Filed Jan. 26, 1989, Ser. No. 303,520
Int. Cl.[4] C08J *9/24*; B29C *67/20, 55/00*
U.S. Cl. 264—127 **5 Claims**

1. A process for manufacturing an article from a heterogeneous composition of unsintered porous polytetrafluoroethylene (PTFE) particles and a fluoroelastomer, comprising:

(a) mixing particulate unsintered porous PTFE particles and fluoroelastomer to form a heterogenous mixture wherein the unsintered porous PTFE particles have become substantially saturated with the tetrafluoroethylene/propylene copolymer fluoroelastomer;



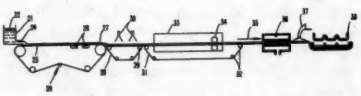
(b) forming the article from the heterogenous mixture.

4,882,114

MOLDING OF FIBER REINFORCED PLASTIC ARTICLES

Bronislaw Radvan, Buckinghamshire, England, and Anthony J. Willis, Bergen-Op-Zoom, Netherlands, assignors to The Wiggins Teape Group Limited, Basingstoke, England

Continuation of Ser. No. 113,904, Oct. 29, 1987, abandoned, which is a continuation-in-part of Ser. No. 926,858, Nov. 4, 1986, abandoned, and Ser. No. 946,167, Dec. 23, 1986, Pat. No. 4,734,321, which is a continuation of Ser. No. 689,000, Jan. 4, 1986, abandoned, said Ser. No. 926,858, is a continuation of Ser. No. 688,712, Jan. 4, 1985, abandoned. This application Mar. 16, 1989, Ser. No. 325,051
Claims priority, application United Kingdom, Jan. 6, 1984, 8400290; Jan. 6, 1984, 8400292
Int. Cl.[4] B29C *43/00*
U.S. Cl. 264—129 **16 Claims**



1. A process for making a shaped article of fiber reinforced synthetic plastics material comprising the steps of

forming a foamed aqueous dispersion comprising from 20% to 60% by weight of single discrete fibers having a modulus of elasticity higher than 10,000 mega pascals, and between 7 and 50 millimeters long, and from 40% to 80% by weight of unconsolidated particulate plastics material selected from the group consisting of a thermoplastic material and a thermosetting material, the particulate plastics material having a particle size of less than about 1.5 millimeters;

laying down and draining said dispersion on a foraminous support so as to form a web;

transferring said web to a heating oven;

heating said web first so as to remove residual moisture therefrom and then so as to bond the fibrous and plastics components together into a self-sustaining permeable sheet while substantially maintaining the particulate form of the plastics material;

transferring said self-sustaining sheet to a through air heating oven;

passing heated air through said sheet so as to cause substantially uniform and homogeneous heating of the components thereof to a temperature at which the viscosity of

the thermoplastic constituting the particulate component is sufficiently low to permit the sheet to be molded into a shaped article;

transferring said heated permeable sheet to a compression mold; and

subjecting said sheet to a compression molding at a predetermined pressure so as to form a shaped fiber reinforced plastic article.

4,882,115

ELECTROLYTIC CAPACITOR AND METHOD FOR PRODUCING AN ELECTROLYTIC CAPACITOR

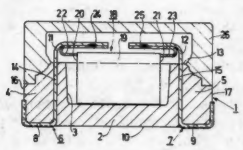
Helfried Schmickl, Maria Saal, Austria, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 7, 1988, Ser. No. 281,292

Claims priority, application Austria, Dec. 17, 1987, 3339/87

Int. Cl.[4] H01G *9/00*

U.S. Cl. 361—538 **14 Claims**



1. Electrolytic capacitor having a synthetic resin housing which forms a receiving space for a capacitor cell and which consists of a dish-shaped housing section which essentially accommodates the capacitor cell having lateral electrode connections, and a lid-shaped housing section which hermetically seals said dish-shaped housing section, connecting leads, which originate from outside the dish-shaped housing section, emerge at one end into the receiving space for the capacitor cell and are connected at said end to the adjacent electrode connection of the capacitor cell, being embedded in the side walls of the dish-shaped housing section adjacent to the electrode connections of the capacitor cell, characterized in that the connecting leads embedded in the side walls of the dish-shaped housing section extend at least for a portion, in the direction away from the base of the dish-shaped housing section, essentially parallel to the capacitor cell and in that the ends of the connecting leads which emerge into the receiving space for the capacitor cell and are connected to the adjacent electrode connections of the capacitor cell are angled in an L shape towards the face of the capacitor cell facing away from the base of the dish-shaped housing section without making contact with each other.

4,882,116

METHOD OF MOLDING A LABEL ON AN ELECTRICAL CORD

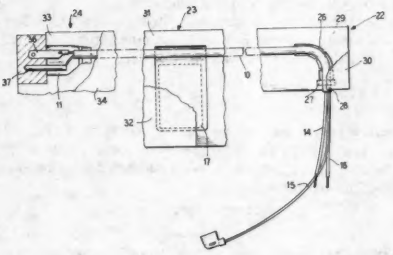
Ronald R. McMillen, Minneapolis, and John J. Anderley, Anoka, both of Minn., assignors to Wagner Spray Tech Corporation, Minneapolis, Minn.

Filed Apr. 29, 1988, Ser. No. 188,442

Int. Cl.[4] B29C *45/14*

U.S. Cl. 264—254 **4 Claims**

1. The method of forming a molded-in-place label on an electrical cord by molding comprising the steps of, disposing a portion of the electrical cord in a mold formed of two pieces formed with three dimensional type, injecting a suitable plastic into said mold to form a label with three dimensional type



which is bonded to said cord and removing said cord and molded in place label from said mold.

4,882,117

INJECTION MOLDING PROCESS FOR MOLTEN PLASTIC

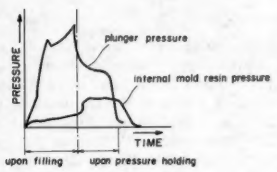
Yoshinobu Takeda, and Kunio Yamamoto, both of Niigata, Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 53,537, May 26, 1987, abandoned, which is a continuation of Ser. No. 766,005, Aug. 15, 1985, abandoned. This application Jun. 28, 1988, Ser. No. 212,149

Claims priority, application Japan, Aug. 16, 1984, 59-170705

Int. Cl.[4] B29C *45/70*

U.S. Cl. 264—328.9 **1 Claim**



1. An injection molding process comprising the steps of:

(a) providing an injection molding press comprising a male die, a female die for being clamped together with said male die to define at least one cavity having extrusion surface area A therebetween, a clamping means for clamping said male and female dies together with a prescribed clamping force F, means for injecting a molten resin into said cavity at a prescribed injecting pressure and holding said resin injected in said cavity with a prescribed holding pressure;

(b) clamping said male and female dies together with said clamping force F to provide said cavity therebetween;

(c) subsequently injecting the molten resin at said prescribed injection pressure into said cavity by said means to fill said cavity with said molten resin, the injection pressure being controlled so as to increase the pressure of the molten resin within said cavity gradually with the passage of time to prevent a pressure boost from occurring upon the termination of the injecting step, while moving said molten resin within said cavity at such a speed that the portion of said molten resin in contact with the surfaces of said cavity is solidified to form a thin hardened layer on the cavity surfaces; and

(d) subsequently holding said molten resin filled in said

cavity at said prescribed holding pressure to solidify the resin within the cavity to produce a molded article, said holding pressure being controlled so as to increase the pressure of the resin within said cavity to a maximum initially during said holding step and to maintain said maximum level substantially throughout said holding step;

said clamping force F of said clamping means being set so as to satisfy the following relationship:

$$F<P\times A$$

where P is said maximum of said pressure of the resin within said cavity during the holding step so that no flash will result in the event a gap is open between said dies due to the existence of the thin hardened layer.

4,882,118

METHOD AND APPARATUS FOR MOLDING FIBER REINFORCED RESIN MATRIX COMPOSITE MATERIAL

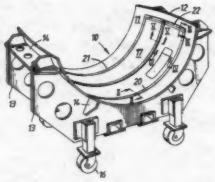
Thomas J. Megarry, Holywood, United Kingdom, assignor to Short Brothers PLC, Belfast, England

Continuation of Ser. No. 841,566, Mar. 20, 1986, abandoned. This application Dec. 1, 1987, Ser. No. 127,564

Claims priority, application United Kingdom, Apr. 1, 1985, 8508419

Int. Cl.[4] B29C *51/10*

U.S. Cl. 264—510 **15 Claims**



1. A method of making a sheetform article from fibre-reinforced resin matrix composite material including the steps of arranging layers of fibres impregnated with uncured resin in tooling which defines a more or less flat moulding face corresponding to the shape which it is desired that a face of the article should assume, covering the fibres and resin with a gas-tight membrane, reducing the gas pressure around the fibres and resin between the tooling and the membrane, heating the tooling and the composite material to a temperature high enough to cure the resin, and cooling the cured article and the tooling to ambient temperature, wherein the method is a stage in the manufacture of a finished article which has an edge surface of a specified profile, and wherein the improvement comprises the steps of

securing on the moulding face of the tooling, prior to arranging the layers of resin-impregnated fibres, at least two periphery elements having a preselected edge profile corresponding to said specified edge profile to define a mould cavity periphery of a shape and size that is predetermined to establish an expanded desired finished shape and size of the article after curing, and also to establish during the moulding step, by virtue of said edge surface profile of each mould periphery element, the said edge surface of the moulded article and the specified profile thereon,

the step of arranging the layers of fibres includes placing layers of fibres impregnated with resin closely abutting the edge surfaces of the periphery elements, and

after arranging the layers of resin-impregnated fibres, allowing at least one of the periphery elements to slide on the moulding face during the heating and cooling steps in response to differential thermal expansion and contraction between the layers of resin impregnated fibres and the moulding face of the tooling without exerting significant compressive force on the edges of the sheet-form article.

10. Tooling apparatus for moulding and heat-curing a sheet-form article laid up from individual layers of fibre-reinforced resin matrix composite material, the tooling comprising:

a base member having a moulding face corresponding to a desired shape of a face of the finished article;

at least one mould periphery element having a first surface for sealingly engaging the surface of the moulding face at a predetermined location on the moulding face and an edge surface extending transversely to the first surface, the edge surface having a shape and a cross-sectional profile corresponding to a desired shape and profile of an edge portion of the finished article; and

means for securing the mould periphery element to the base member at said predetermined location with the first surface of the periphery element in substantially sealing engagement with the moulding face, such that the edge surface of the mould periphery element defines a portion of a continuous periphery of a mould cavity surrounding the moulding face of said base member, said securing means comprising means for selectively clamping the mould periphery element sufficiently firmly against the base member to maintain the element at said location during laying up of a composite material in said mould cavity and thereafter sufficiently loosely to allow the element to slide on the moulding face after the article has been moulded, in response to differential thermal expansion and contraction between the composite material and the base member during heating thereof to at least 177° C. to cure the resin in the composite material and during subsequent cooling to ambient temperature, without exerting significant compressive force on the edge portion of the moulded article.

4,882,119

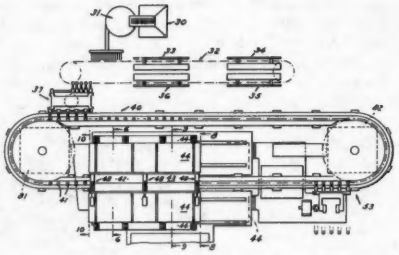
METHOD FOR MAKING PARTIALLY CRYSTALLINE BIAXIALLY ORIENTED HEAT SET HOLLOW PLASTIC CONTAINERS

Prakash R. Ajmera, Toledo, Ohio, assignor to Owens-Illinois Plastic Products Inc., Toledo, Ohio

Filed Jun. 22, 1987, Ser. No. 64,649

Int. Cl.[4] B29C *49/12, 49/18*

U.S. Cl. 264—526 **27 Claims**



1. A method for making a partially crystalline, biaxially oriented heat set hollow plastic container from a hollow parison of crystallizable material having an open end and a closed end comprising

engaging the open end of a first plastic parison which is at a temperature within its molecular orientation temperature range,

enclosing a hot mold about the parison at a first position, said mold being at heat setting temperature,

simultaneously enclosing a cold mold at a second position about container previously blown in the hot mold to cool the previously blown container,

expanding said plastic parison within said hot mold by inter-

nal pressurization through the open end to induce biaxial orientation of the plastic parison and force the plastic parison into intimate contact and conformance with the hot mold and to maintain contact by such internal pressurization between the mold and biaxially oriented container for a time sufficient to induce partial crystallization in the biaxially oriented container and to heat set said container,

simultaneously moving the hold mold from said first position to said second position and the cold mold from said second position to a third position during the step of expanding the parison within the hot mold heat setting of the container in the hot mold and during the step of cooling of the previously blown container in the cold mold,

thereafter providing a lower internal pressurization of the container in the hot mold and exhausting the pressurization in the cold mold to atmospheric pressure,

substantially simultaneously opening the hot mold and cold mold,

simultaneously moving the open hot mold from the second position to the first position and open cold mold from the third position to the second position,

enclosing the to mold at the first position about a second plastic parison which is at a temperature within its molecular orientation temperature range, and

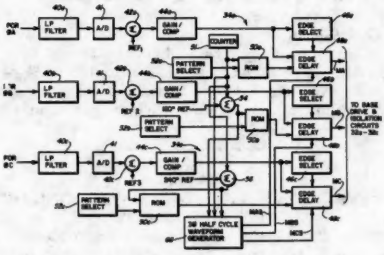
simultaneously enclosing the cold mold at the second position about the container previously blown from the first parison with the closing of the hot mold.

4,882,120

DC CONTENT CONTROL FOR AN INVERTER

Derrick I. Roe, Rockford, Ill.; Christopher J. Rozman, Delavan, Wis., and Bradley J. Recker, Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 16, 1988, Ser. No. 285,119
Int. Cl.[4] H02P *13/18;* H02M *5/458*
U.S. Cl. 363—98 **7 Claims**



1. A control for an inverter having a switch which is operated in accordance with a waveform having spaced rising and falling edges, comprising:

means for detecting the magnitude of a DC component in the inverter AC output power; and

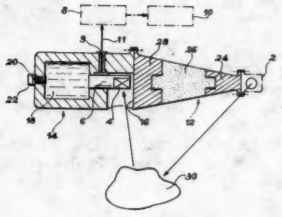
means responsive to the detecting means for adjusting the time of selected rising or falling edges to reduce the magnitude of the DC component.

4,882,121

APPARATUS FOR THE DETECTION OF E. G. EXPLOSIVE SUBSTANCES

Gérard Grenier, Limeil-Brevannes, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Division of Ser. No. 917,683, Oct. 10, 1986, abandoned. This application Mar. 31, 1988, Ser. No. 175,629
Claims priority, application France, Oct. 18, 1985, 8515474
Int. Cl.[4] G21G *1/06;* G21H *5/00*
U.S. Cl. 376—159 **7 Claims**



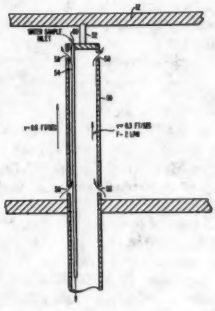
1. A process for detecting an explosive which may be contained in an object, wherein it comprises irradiating the object by means of fast neutron pulses, said fast neutrons having an energy between 7 and 14 MeV, and detecting prompt gamma photons emitted in coincidence with said neutron pulses and having an energy of 5.106 MeV characterizing nitrogen, and prompt gamma photons emitted in coincidence with said neutron pulses and having an energy of 6.130 MeV characterizing oxygen, determining the relative atomic percentage of nitrogen and oxygen in the object by means of the detected 5.106 MeV and 6.130 MeV photons, and comparing said percentage to N/O ratios of known explosives.

4,882,122

METHOD AND APPARATUS FOR OBTAINING A WATER SAMPLE FROM THE CORE OF A BOILING WATER REACTOR

Robert A. Head, San Jose; Robert L. Cowan, and Robert J. Law, both of Livermore, all of Calif., assignors to General Electric Company, San Jose, Calif.

Filed Feb. 10, 1988, Ser. No. 154,260
Int. Cl.[4] G21C *17/00*
U.S. Cl. 376—245 **3 Claims**



3. A process for the evacuation of water sample from a boiling water reactor in the core bypass region at the vicinity of the top guide, said process comprising the steps of:

providing a tube having a first end for insertion to the vicinity of the top guide in the core bypass region of said

nuclear reactor and have a second end at a location remote from said reactor;

inserting said first end of said tube in a local power range monitor conduit in the core bypass region with the open end of said tube exposed to nearly saturated water adjacent the top guide;

reducing the pressure in said tube from the second end of said tube whereby the water adjacent the open end of said tube flashes to a steam water mixture of high specific volume and rapidly passes through said tube; and,

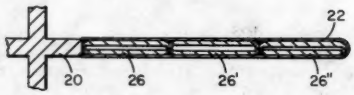
condensing said steam at said remote end for analyzing the contents of said water.

4,882,123

HAFNIUM CONTROL ROD FOR NUCLEAR REACTORS

James E. Cearley; David A. Salmon, and Paul Van Diemen, all of San Jose, Calif., assignors to General Electric Company, San Jose, Calif.

Filed Mar. 1, 1988, Ser. No. 162,449
Int. Cl.[4] G21C 7/10
U.S. Cl. 376—333 5 Claims



1. An improved control device for nuclear fission reactor having a core of fissionable fuel in an assembly composed of fuel units grouped into spaced apart bundles which are immersed in liquid coolant in operating service, and wherein said control device is provided with means for reciprocal movement into and out from the core of fuel intermediate the spaced apart bundles of the assembly, said control device having a frame including an upper and a lower support member connected by an elongated central spine support with the upper and lower support members each of a transverse cruciform configuration having four radially extending arms projecting outward from the central spine support and a sheath of bladelike configuration extending from each of the arms of the upper support to each of the arms of the lower support and each of said sheaths longitudinally adjoining the spine support, each sheath containing therein a neutron absorbing component consisting essentially of a plurality of parallel flattened hollow tubes of hafnium metal with their axis aligned with the spine support, and each sheath and each of the plurality of parallel flattened hollow tubes therein in their flattened portions being each provided with a multiplicity of openings along their length for entry and the presence of liquid coolant through the length of the flattened hollow tubes of hafnium.

4,882,124

ALLOYS HAVING EXCELLENT EROSION RESISTANCE

Toshihiro Uehara, and Rikizo Watanabe, both of Yasugi, Japan, assignors to Extra-Ministerial Bureau of Ministry of Trade & Industry Agency of Industrial Science & Technology, Tokyo, Japan

Continuation-in-part of Ser. No. 166,325, Mar. 11, 1988, abandoned. This application Oct. 11, 1988, Ser. No. 256,214
Claims priority, application Japan, Jun. 18, 1987, 62-150174; Fed. Rep. of Germany, Mar. 14, 1988, 3808451; France, Mar. 14, 1988, 88 03287; Sweden, Mar. 15, 1988, 8800919; United Kingdom, Mar. 15, 1988, 8806125
Int. Cl.[4] C22C 38/38
U.S. Cl. 420—74 2 Claims

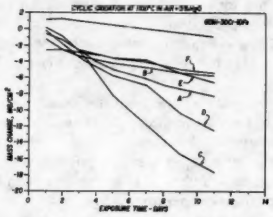
1. An alloy having excellent erosion resistance which comprises more than 0.90 wt.% and less than 1.7 wt.% of carbon, not more than 2.5 wt.% of silicon, from 10 to 25 wt.% of manganese, from 6 to 20 wt.% of chromium, more than 4 wt.% and less than 7 wt.% of vanadium, not more than 0.1 wt.% of nitrogen and the balance essentially consisting of iron.

4,882,125

SULFIDATION/OXIDATION RESISTANT ALLOYS

Gaylord D. Smith, and Curtis S. Tassen, both of Huntington, W. Va., assignors to INCO Alloys International, Inc., Huntington, Va.

Filed Apr. 22, 1988, Ser. No. 184,771
Int. Cl.[4] C22C 19/05
U.S. Cl. 420—443 12 Claims



1. A nickel-base, high chromium alloy characterized by excellent resistance to (1) sulfidation and (ii) oxidation at elevated temperatures as high as 2000° F. (1093° C.) and higher, (iii) a stress-rupture life of about 200 hours or more at a temperature at least as high as 1800° F. (983° C.) and under a stress of 2000 psi, (iv) good tensile strength and (v) good ductility both at room and elevated temperature, said alloy consisting essentially of about 27 to 35% chromium, about 2.5 to 5% aluminum, about 2.5 to about 6% iron, 0.5 to 2.5% columbium, up to 0.1% carbon, up to 1% each of titanium and zirconium, up to 0.05% cerium, up to 0.05% yttrium, up to 1% silicon, up to 1% manganese, and the balance nickel.

4,882,126

HIGH-STRENGTH ZINC BASE ALLOY

Atsuyuki Okada, Tokyo; Kouhei Kubota; Tsutomu Satoh, both of Ageo; Hiroshi Gotoh, Ageo, and Takeshi Oziro, Ageo, all of Japan, assignors to Mitsui Mining & Smelting Co., Ltd., Tokyo, Japan

Filed Jun. 22, 1988, Ser. No. 209,977
Claims priority, application Japan, Jul. 1, 1987, 62-162220; Dec. 24, 1987, 62-329387; Apr. 20, 1988, 63-97934
Int. Cl.[4] C22C 18/04
U.S. Cl. 420—516 9 Claims

1. A high-strength zinc base alloy consisting of 5.2 to 8.6 wt.% of Al, 3.0 to 6.5 wt.% of Cu, 0.01 to 0.20 wt.% of Mg, 0.03 to 0.3 wt.% of a member selected from the group consisting of Co and a mixture of Co and Ni, and the balance being Zn.

4,882,127

DEVICE FOR SOLID PHASE SEQUENCING OF NUCLEIC ACID FRAGMENTS

Andre Rosenthal, Berlin; Hans-Dieter Hunger; Horst Kagelmaker, both of Zepernick, and Monika Grützschus, Berlin, all of German Democratic Rep., assignors to Akademie Der Wissenschaften Der DDR, Berlin, German Democratic Rep.

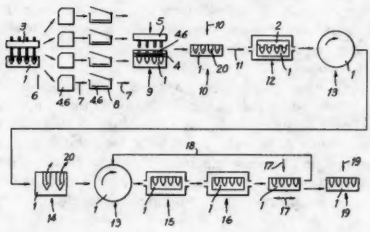
Division of Ser. No. 761,107, Jul. 31, 1985, Pat. No. 4,849,077.
This application Nov. 12, 1987, Ser. No. 120,092
Claims priority, application German Democratic Rep., Aug. 6, 1984, 2659974; Aug. 6, 1984, 2659982; May 14, 1985, 2763283
Int. Cl.[4] C12M 1/16; B01L 3/00, 9/00
U.S. Cl. 422—50 12 Claims

1. A device for solid phase sequencing of nucleic acid sequents comprising

a plurality of sequencing blocks each storing and processing n nucleic acid fragments, said fragments being immoblized on individual carrier segments or in homogenous phase during a sequencing process, each of sequencing blocks including a base block and a plurality of reaction vessels inserted in said base block and corresponding to the number n of different nucleic acid fragments to be sequenced.

a plurality of lids for closing said sequencing blocks each having a plug-like elevations according to a number and a distribution pattern of the reaction vessels;

a sample dosing device for orienting n labeled nucelic acid samples from the sequencing blocks onto areas of a carrier matrix in a simultaneous fashion, said sample dosing device including a capillary holder and a plurality of capillaries with the number of the capillaries corresponding to the number n of different nucleic acid samples to be sequenced in each block, the capillaries being arranged in the capillary holder according to the distribution pattern of the reaction vessels and disposed on a flat plane with a distance between capillary orifices from the capillary holder greater than a depth of the reaction vessels;



a plurality of carrier holders for fixing said carrier matrix in a predetermined position during the immobilization of the nucleic acid samples with the sample dosing device, each of the carrier holders having a recess with dimensions in height, width and depth corresponding to carrier holders also having a plurality of bores with a number and distribution pattern corresponding to those of the reaction vessels and with a diameter which is somewhat larger than a diameter of the capillary;

a punch for simultaneous punching of n immobilized and chemically modified nucleic acid samples as said individual carrier segments out of the carrier matrix into the sequencing blocks, said punch including a punching plate and a plurality of punching pins corresponding to holes in the punch plate and arranged with a number and distribution pattern which also corresponds to those of the reaction vessels; and

means for combining the sequencing blocks with the lids, the sample dosing device, the carrier holders and the punch, respectively.

4,882,128

PRESSURE AND TEMPERATURE REACTION VESSEL, METHOD, AND APPARATUS

Istvan S. Hukvari; Henry J. Albert, both of Bettendorf, Iowa; Vernon G. Moon, Moline, Ill., and Michael R. Steffenson, Davenport, Iowa, assignors to Parr Instrument Company, Moline, Ill.

Filed Jul. 31, 1987, Ser. No. 80,037
Int. Cl.[4] B01J *19/24*
U.S. Cl. 422—119 **14 Claims**

7. A pressure and temperature reaction vessel for chemical and physical reactions, comprising:

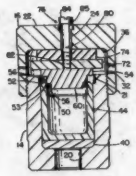
a containment housing constructed from substantially microwave-transmissible materials, having a base and a removable lid together defining a reaction chamber;

a sealing means mounted to move between different first and second sealing positions for sealing the reaction chamber; and

a substantially microwave-transmissible self-resetting visual indicator means, for indicating various different pressures within the reaction chamber.

9. A method for heating and reacting reactants in a pressure and temperature reaction vessel, comprising the steps of:

placing reactants in a substantially microwave-transmissive pressure and temperature reaction vessel, wherein the



vessel has a seal mounted to move between at least two distinct sealing positions and an operably connected visual indicator for indicating various different pressures within the reaction chamber and means for venting the reaction chamber if pressure exceeds a preselected limit;

exposing the vessel to microwaves to heat the reactants and pressurize the reaction chamber; and

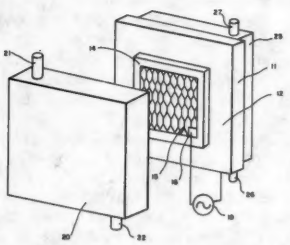
monitoring the visual indicator to determine various pressures within the vessel during and after the microwave exposure step.

4,882,129

OZONE GENERATOR CELL

Dana Andrews, Mountain View, and Hiroji Hanawa, Sunnyvale, both of Calif., assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Aug. 26, 1987, Ser. No. 89,576
Int. Cl.[4] C01B *13/11*
U.S. Cl. 422—186.2 **15 Claims**



1. An ozone generator cell comprising

one or more combinations each including a thermally conductive solid metallic plate-like base forming a part of water cooling means and having a planar flat surface, a planar ceramic sheet separated from cooling water of said cooling system by said base and attached by a surface-to-surface contact to said flat surface of said base, and a discharge electrode attached to said cramic sheet distal from said base,

enclosure means with an inlet and outlet adapted to cause a gas to flow therein from said inlet to said outlet over said discharge electrode, and

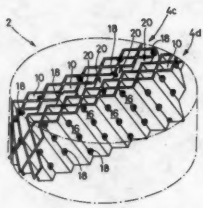
means for causing a corona discharge between said discharge electrode and said base.

4,882,130

POROUS STRUCTURE OF FLUID CONTACT

Katsuya Asai, Nagoya, and Hideyuki Masaki, Gifu, both of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Filed Jun. 7, 1988, Ser. No. 203,133
Int. Cl.[4] B32B *3/12*
U.S. Cl. 422—310 10 Claims



1. A porous structure through which at least one fluid flows in a nominal direction, comprising:

at least one packing having a predetermined thickness in said nominal direction, said at least one packing being disposed so as to extend in a plane perpendicular to said nominal direction;

each of said at least one packing consisting of a plurality of honeycomb blocks arranged in a first direction in said plane;

each of said plurality of honeycomb blocks including a plurality of partition walls which define a plurality of inclined channels which are inclined by a predetermined angle with respect to said nominal direction, each of said inclined channels having opposite open ends at respective upstream and downstream ends of said each honeycomb block as seen in said nominal direction, said plurality of inclined channels being provided in a plurality of parallel rows arranged in said first direction, said inclined channels of each of said rows being spaced apart from each other in a second direction in said plane, which second direction is perpendicular to said first direction;

said plurality of partition walls including intersections by which said inclined channels of said each row are spaced apart from each other in said second direction, said partition walls further defining a pair of voids between adjacent channels of said inclined channels of said each row, said pair of voids being disposed on opposite sides of each of said intersections as seen in said first direction, at least one of said pair of voids constituting part of the inclined channels of the rows adjacent to said each row, one of said pair of voids associated with the row which forms an outermost row forming an outer opening which is open outwardly of said each honeycomb block;

said partition walls having a plurality of perforations formed therethrough in a direction intersecting said rows of the inclined channels, so as to provide fluid communications between said adjacent channels of said each row, between the inclined channels of the adjacent rows, and between said inclined channels and said outer opening; and

said plurality of honeycomb blocks being positioned and connected to each other such that directions of inclination of said inclined channels of the adjacent honeycomb blocks are reversed to each other with respect to said nominal direction of flow of said at least one fluid, and such that said outer openings formed between said adjacent honeycomb blocks define a complex channel therebetween.

4,882,131

PROCESS FOR RECOVERING TUNGSTEN FROM ORGANIC SOLUTIONS

John A. Powers, New Albany; James C. Patton, and James N. Christini, both of Towanda, all of Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed Apr. 30, 1987, Ser. No. 44,169
Int. Cl.[4] C01G *41/00*
U.S. Cl. 423—54 3 Claims

1. In a process wherein tungsten values are extracted from an aqueous alkali metal tungstate solution containing impurities by an organic solution containing an amine extractant wherein the organic solution consists essentially of from about 6% to about 10% by volume of said amine extractant, and the balance of said organic solution being an aromatic solvent consisting essentially of a mixture of alkyl benzenes wherein the alkyl benzenes have molecular weights of 120, 134, or 148, and the total number of carbon atoms in the alkyl chains attached to the benzene ring are either 3, 4, or 5, and thereafter the tungsten values are removed from the organic solution by contacting said organic solution with a stripping agent to form a tungsten containing strip solution, the improvement comprising carrying out the stripping step in an aqueous continuous mode, and having as the stripping agent, an aqueous solution formed from ammonium metatungstate, wherein said aqueous solution has a tungsten concentration which allows said tungsten containing strip solution to have a specific gravity of no greater than about 1.5, and sufficient ammonia to maintain the pH of said stripping agent at from about 5 to about 8, said stripping step being carried out with the temperature of said stripping agent being no greater than about 35° C. to produce a tungsten containing strip solution wherein the tungsten is in the form of a precurser of ammonium metatungstate.

4,882,132

SOLVENT EXTRACTION OF COBALT USING HYDROXAMIC ACIDS

Bruce F. Monzyk, Maryland Heights, and Arthur R. Henn, Creve Coeur, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 566,015, Dec. 27, 1983, abandoned. This application Jan. 20, 1987, Ser. No. 4,929
Int. Cl.[4] C01G *51/00*
U.S. Cl. 423—139 13 Claims

1. A process for extracting cobalt from a cobalt bearing aqueous solution which comprises:

(a) contacting the aqueous solution at an equilibrium pH of at least about 7 with a hydrocarbon solvent comprising at least 2% by weight of an N-alkylalkanohydroxamic acid having at least about 8 carbon atoms to extract cobalt from the aqueous solution;

(b) separating the hydrocarbon solvent cobalt loaded organic phase; and

(c) recovering the cobalt loaded organic phase.

4,882,133

METHOD FOR PRODUCING A FLAKY MATERIAL

Kunio Saegusa, Niihama, Japan, assignor to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation of Ser. No. 163,203, Feb. 26, 1988, abandoned, which is a continuation of Ser. No. 23,374, Mar. 9, 1987, abandoned. This application Jan. 26, 1989, Ser. No. 302,128
Claims priority, application Japan, Mar. 14, 1986, 61-57924
Int. Cl.[4] C01G *23/04*
U.S. Cl. 423—335 2 Claims

1. A method for producing flaky materials which comprises coating a smooth surface with an aqueous liquid sol of compounds, in a dispersion medium wherein said compounds are selected from the group consisting of oxides and hydroxides of one or more metals having a valence of 2 or more and belonging to Group IIIa, IVa and IVb of the Periodic Table and silica to form a coated film; solidifying the film into gel by means of

removal of the dispersion medium by vaporization or by means of adjusting the pH; shrinking the volume of the said gel by further vaporization of the dispersion medium from the gel to produce flaky material; and then scraping the flaky material off the smooth surface.

4,882,134

RECOVERY OF HYDROGEN FLUORIDE FROM AN AQUEOUS SOLUTION CONTAINING AMMONIUM FLUORIDE AND HYDROGEN FLUORIDE

Joseph Mizrahi, Haifa, Israel, assignor to IMC Fertilizer, Inc., Northbrook, Ill.

Filed Apr. 10, 1987, Ser. No. 37,160
Int. Cl.[4] C01B *7/19, 21/087, 21/088*
U.S. Cl. 423—356 14 Claims

1. A method of recovering HF from an aqueous solution containing NH_4F and HF comprising:

contacting the solution with a water-immiscible, amine-containing extractant which extracts HF in preference to NH_4F;

adjusting one or more parameters selected from the group consisting of the HF:NH_4F molar ratio of the aqueous solution, the identity of the amine, the concentration of the amine in the extractant and the contact temperature to achieve an HF:amine molar ratio in the extractant of at least about 1.2;

separating the HF-loaded amine extractant from the aqueous solution; and

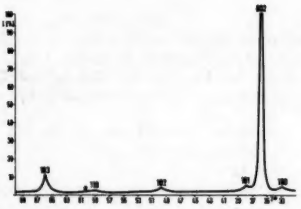
stripping HF from the separated amine extractant in an amount sufficient to lower the HF:amine molar ratio in the extractant by at least about 0.2.

4,882,135

PROCESS FOR THE PRODUCTION OF TRANSPARENT ALUMINUM NITRIDE COATINGS FROM AMMINE SALTS OF ALUMINUM IODIDES

Dieter Peters, Hürth, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Sep. 2, 1988, Ser. No. 240,095
Claims priority, application Fed. Rep. of Germany, Sep. 18, 1987, 3731455
Int. Cl.[4] C01B *21/072*
U.S. Cl. 423—412 7 Claims



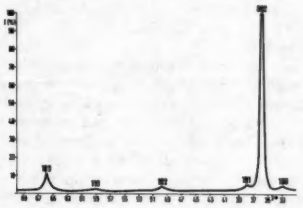
1. A process for the production of transparent aluminum nitride coatings, wherein the aluminum nitride coatings are obtained by evaporation of ammine salts of aluminum iodide in an evaporation zone and subsequent ammonolysis in a decomposition zone at temperatures above 550° and up to 1200° C.

4,882,136

PROCESS FOR THE PRODUCTION OF TRANSPARENT ALUMINUM NITRIDE FILMS

Dieter Peters, Hürth, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Sep. 2, 1988, Ser. No. 240,139
Claims priority, application Fed. Rep. of Germany, Sep. 18, 1987, 3731455
Int. Cl.[4] C01B *21/072*
U.S. Cl. 423—412 10 Claims



1. A process for the production of a transparent aluminum nitride film, wherein the aluminum nitride comprises a monocrystal and is obtained by evaporation of ammine salts of aluminum iodide in an evaporation zone and subsequent ammonolysis in a decomposition zone at 380 to 550° C.

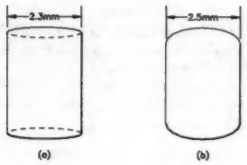
8. A monocrystalline, transparent aluminum nitride film window having a thickness of up to 20 μm and a surface roughness of less than 0.3 μm and in which the crystallographic C axis is perpendicular to the film plane.

4,882,137

COATED VETERINARY IMPLANTS

Linton D. Staples, East Kew; Robert I. Norman, Dandenong; Robert B. Davey, East Doncaster; Catherine Hastings, Hawthorn; Jennifer Kidd, Camberwell, and Jatni Rachmat, South Yarra, all of Australia, assignors to Gene Link Australia Limited, South Melbourne, Australia

Filed May 20, 1987, Ser. No. 52,535
Claims priority, application Australia, May 23, 1986, PH 6077; Mar. 2, 1987, PH 604
Int. Cl.[4] A61K *2/00*
U.S. Cl. 424—423 22 Claims



1. A coated veterinary implant comprising:

(a) a veterinary implant including an effective amount of:

(i) an active ingredient selected from the group consisting of melatonin, melatonin analogues, and mixtures thereof, wherein said melatonin analogues and mixtures thereof exert substantially the same biological effect on seasonal breeding activity or other seasonal physiological responses of animals as said melatonin; and

(b) a coating for said veterinary implant (a) formed from a physiologically compatible polymeric coating composition comprising a water-insoluble film-forming high molecular weight polymer; which implant, in use, releases

said active ingredient at a rate sufficient to maintain the blood level of said active ingredient at or above a level sufficient, and for a period sufficient, to regulate seasonal breeding activity or other seasonal physiological responses of an animal to be treated.

4,882,138

METHOD FOR PREPARATION OF DIAMOND CERAMICS

John M. Pinneo, Woodside, Calif., assignor to Crystallume, Menlo Park, Calif.

Continuation of Ser. No. 32,169, Mar. 30, 1987, abandoned. This application Jun. 7, 1988, Ser. No. 204,058

Int. Cl.[4] B01J *3/06*

U.S. Cl. 423—446 7 Claims

1. A process for consolidating diamond particles into a mechanically stable diamond mass comprising the step of contacting a compacted aggregation of diamond particles with atomic hydrogen, a gaseous carbon source and an agent which improves carbon atom mobility upon surfaces of said particles, under conditions whereby diamond is epitaxially deposited onto said diamond particles, causing said particles to consolidate into a mechanically stable diamond mass substantially devoid of interstitial spaces.

4,882,139

IMPROVED PRODUCTION OF CARBON FIBERS

Herbert Beneke, Castro-Rauxel, and Siegfried Peter, Uttenreuth-Weiher, both of Fed. Rep. of Germany, assignors to Rutgerswerke AG, Fed. Rep. of Germany

Filed Nov. 30, 1988, Ser. No. 277,700

Claims priority, application Fed. Rep. of Germany, Dec. 8, 1987, 3741482

Int. Cl.[4] C01B *31/02;* C10C *1/00, 1/20*

U.S. Cl. 423—447.4 7 Claims

1. In a process for the production of carbon fibers from high boiling bituminous substances in which a purified and polymerized concentrated carbon fiber precursor containing mesophase pitch is spun into fibers which are oxidized and then carbonized and optionally graphitized, the improvement consisting essentially of just before spinning a supercritical gas is dissolved in mesophase pitch at a pressure of 100 to 350 bars and a temperature up to 150° K. below the melting temperature of the mesophase pitch to form a low viscosity melt, separating the latter by settling into an isotropic phase and an anisotropic carbon fiber precursor and spinning the latter at the said temperature into fibers.

4,882,140

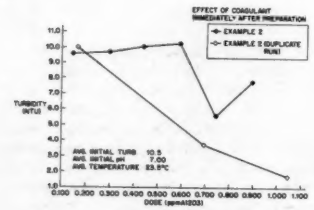
SOLID ALUMINUM HYDROXIDE COMPOSITIONS

Larry W. Becker, Marcellus, N.Y., assignor to General Chemical Corporation, Morristown, N.J.

Filed May 6, 1987, Ser. No. 47,423

Int. Cl.[4] C01F *7/34, 7/56, 7/74*

U.S. Cl. 423—629 12 Claims



1. A method of preparing solid aluminum hydroxide having improved solubility, filterability and stability comprising:

(a) preparing a concentrated aqueous solution of aluminum ion and an anion by dissolving an aluminum salt;

(b) adding to the solution a stoichiometric amount of a solid base to form a mixture, wherein the base comprises an alkali metal, alkali earth metal or other metallic cation and wherein the base does not contribute an anion other than hydroxide to the solution; and

(c) stirring the mixture such that the aluminum salt and the base react completely to form a solid product comprising $Al(OH)_3$ and an adduct of the anion from the aluminum salt and the cation from the base, wherein the anion from the aluminum salt and the cation from the base are selected such that most of the water in the aqueous solution is bound to the adduct as water of hydration such that a substantially solid product is formed.

4,882,141

TISSUE IMAGING UTILIZING LABELLED STEROIDS

Richard J. Baranczuk, Overland Park, and Jay A. Spicer, Kansas City, both of Kans., assignors to Bio-Medical Research Laboratories, Inc., Overland Park, Kans.

Continuation-in-part of Ser. No. 663,572, Nov. 22, 1984, abandoned, and a continuation-in-part of Ser. No. 12,254, Feb. 9, 1987, which is a continuation-in-part of Ser. No. 663,600, Nov. 22, 1984, Pat. No. 4,659,517. This application Nov. 6, 1987, Ser. No. 118,237

The portion of the term of this patent subsequent to Apr. 21, 2004, has been disclaimed.

Int. Cl.[4] A61K *49/02;* C07J *00/00*

U.S. Cl. 424—1.1 9 Claims

1. A method of imaging a tissue in vivo, said tissue having steroid receptors present therein; said method comprising the steps of:

(a) applying a labeled steroid material to said tissue; said material including 16-^{123}I-17-beta-estradiol; said material having a minimum specific activity of 5,000 curies per millimole and upon decay releasing radiation of sufficient energy to penetrate said body;

(b) allowing a portion of said labeled steroid material to substantially join with said receptors in said tissue; and

(c) thereafter obtaining an image of said labeled steroid material in said tissue by utilization of detection means appropriately positioned to detect said radiation from said radioactive component.

4,882,142

BONE MARROW SUPPRESSING AGENTS

Jaime Simon, Angleton; Joseph R. Garlich, Lake Jackson; David A. Wilson, and Kenneth McMillan, both of Richwood, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 19, 1988, Ser. No. 284,875

Int. Cl.[4] A61K *43/00;* C07F *5/00*

U.S. Cl. 424—1.22 30 Claims

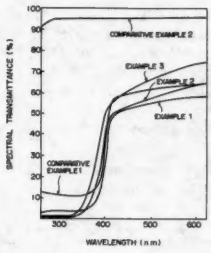
1. A method for suppressing bone marrow which comprises administering to a mammal in need of such treatment a bone marrow suppressing amount of at least one bone marrow suppressing composition comprising at least one radionuclide selected from the group consisting of Samarium-153, Gadolinium-159, and Holmium-166 complexed with 1,4,7, 10-tetraazacyclododecanetetramethylenephosphonic acid or a physiologically acceptable salt thereof.

4,882,143

LAMINA AND A COSMETIC COMPRISING THE SAME

Hidekimi Kadokura, and Kunio Saegusa, both of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Nov. 10, 1987, Ser. No. 119,092
Claims priority, application Japan, Nov. 17, 1986, 61-273396
Int. Cl.[4] A61K *7/42*
U.S. Cl. 424—59 5 Claims



1. A cosmetic comprising a lamina having an average thickness of from about 0.1 um to about 5.0 um comprising a laminar substance as a matrix and a finely divided metal or metal compound dispersed therein, wherein the difference in refractive index between the laminar substance and the finely divided metal or metal compound is not less than 0.1.

4,882,144

SOLID, RAPIDLY RELEASED MEDICAMENT PREPARATIONS CONTAINING DIHYDROPYRIDINES, AND PROCESSES FOR THEIR PREPARATION

Ahmed Hegasy, Leverkusen, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 728,123, Apr. 29, 1985, abandoned, which is a continuation of Ser. No. 433,570, Oct. 8, 1982, abandoned. This application May 19, 1986, Ser. No. 864,677
Claims priority, application Fed. Rep. of Germany, Oct. 29, 1981, 3142853; Feb. 16, 1982, 3205399
Int. Cl.[4] A61K *31/78, 31/44*
U.S. Cl. 424—80 8 Claims

1. A solid, rapidly absorbable preparation in unit dosage form comprising 1 part by weight of a dihydropyridine as an active compound, 0.2 to 6.0 parts by weight of PVP having a mean molecular weight of 15,000 to 50,000, and a mixture of absorptive excipients comprising 3.5 to 15 parts by weight of cellulose, 0.25 to 4.0 parts by weight of starch, 0.25 to 4.0 parts by weight of crosslinked insoluble PVPP, said preparation provided by (a) coprecipitation of the dihydropyridine and the PVP, (b) granulation of the resultant coprecipitation without removal of the parent solution and (c) admixture with the adsorptive excipients.

4,882,145

T CELL EPITOPES OF THE HEPATITIS B VIRUS NUCLEOCAPSID PROTEIN

George B. Thornton; Ann M. Moriarty; David R. Milich, and Alan McLachlan, all of San Diego, Calif., assignors to Scripps Clinic and Research Foundation, La Jolla, Calif.

Continuation-in-part of Ser. No. 939,617, Dec. 9, 1986, Pat. No. 4,818,527. This application Oct. 7, 1987, Ser. No. 106,538
The portion of the term of this patent subsequent to Apr. 4, 2006, has been disclaimed.
Int. Cl.[4] A61K *39/00, 39/29;* C07K *7/00, 15/00*
U.S. Cl. 424—88 2 Claims

1. A T cell stimulating polypeptide consisting essentially of an amino acid residue sequence corresponding to a formula selected from the group consisting of:

(a) MDIDPYKEFGATVELLSFLP,
(b) RDLLDT.ASALYREALESPEHCSPHH,
(c) TWVGVNLEDPASRDLVVSYVNTNMG,
(d) VVSYVNTNMGLKFRQL,
(e) VVSYVNTNMGLK,
(f) LLWFHISCLTFGRETVIEYLV,
(g) LLWFHISCLTF,
(h) VSFGVWIRTPPAYRPPNAPIL,
(i) VSFGVWIRTPPA,
(j) PPAYRPPNAPIL, and
(k) WIRTPPAYRPPN.

4,882,146

PREVENTING ADP-RIBOSYLATION OF G-PROTEINS IN A LIVING SUBJECT

Richard A. Shiells, Barwick Near Ware, and Gertrude Falk, London, both of England, assignors to University College London, London, England

Filed Mar. 28, 1988, Ser. No. 174,407
Claims priority, application United Kingdom, Mar. 26, 1987, 8707293; Jun. 22, 1987, 8714544
Int. Cl.[4] A61K *31/52, 31/44, 31/195*
U.S. Cl. 424—10 3 Claims

1. A method of reversing or blocking the adverse effects in a living subject of a microbial toxin which ADP-ribosylates G-group which comprises administering to said subject endangered by said microbial toxin an amount of nicotinamide effective to reverse or block said adverse effect.

4,882,147

NOVEL POLYNUCLEOTIDE ANALOGS, METHODS FOR INHIBITING NUCLEIC ACID POLYMERASES AND METHODS FOR INDUCING SYNTHESIS OF INTERFERON

Thomas J. Bardos, Snyder; Yau-Kwan Ho, Williamsville; Steven J. Kasper, Rochester, and Robert G. Hughes, Jr., Kenmore, all of N.Y., assignors to The Research Foundation of State University of New York, Albany, N.Y.

Filed Dec. 16, 1987, Ser. No. 133,524
Int. Cl.[4] A61K *39/00, 45/02*
U.S. Cl. 424—85.4 22 Claims

1. A partially substituted 3′→5′ polyribonucleotide or salts thereof comprising a polymeric chain derived from a pyrimidine base-containing mononucleotide selected from the group consisting of cytidine-5′-phosphoric acid (CMP) and a uridine-5′-phosphate (UMP) in which from about 5 to about 90 percent of the hydrogens in the 5-position of the pyrimidines in the polymer chains are substituted with fluorine and in addition from about 1 to about 30 percent of the hydrogens in the 5-position of the pyrimidines in the polymer chains are substituted with mercapto groups which may be present in their oxidized disulfide form.

4,882,148

CRACK PREVENTION AND IMPROVED THROMBOGENICITY OF IMPLANTED PROSTHESES BY SULFONATION

Leonard Pinchuk, Miami, Fla., assignor to Corvita Corporation, Miami, Fla.

Filed Jun. 18, 1987, Ser. No. 63,537
Int. Cl.[4] A61K *2/00*
U.S. Cl. 424—423 30 Claims

1. A treatment method for substantially preventing in vivo cracking of biocompatible surfaces of implanted devices for medical use, consisting essentially of:

providing a shaped substrate of an implantable medical device having a biocompatible polymeric surface that is susceptible to cracking when subjected to subcutaneous implantation under in vivo conditions for substantial time periods, such in vivo conditions including those that promote crack-forming biodegradation of said biocompatible polymeric surface;

applying a crack preventive composition to said biocompatible polymeric surface, said crack preventive composition including a sulfonating agent, said sulfonating agent is selected from the group consisting of fuming sulfuric acid, concentrated sulfuric acid, sulfur trioxide vapors, and blends thereof with an alcohol or a blend of alcohols;

reacting said sulfonating agent with said biocompatible polymeric surface in order to substantially prevent in vivo cracking of said surface without requiring any additional treatment of said surface; and

said providing step includes selecting said substrate to contain a polymeric structure which contains aromatic moieties.

4,882,149

PHARMACEUTICAL DEPOT PREPARATION

Myron Spector, Atlanta, Ga., assignor to Ed. Geistlich Sohne A.G. fur Chemische Industrie, Lucerne, Switzerland

Continuation of Ser. No. 6,557, Feb. 18, 1987, abandoned. This application Sep. 21, 1988, Ser. No. 248,302

Claims priority, application United Kingdom, Jun. 4, 1985, 8514055

Int. Cl.[4] A01N *25/00*

U.S. Cl. 424—425 **9 Claims**

1. Pharmaceutical depot preparations for implantation into bone tissue comprising natural bone mineral from which the naturally associated fat and bone-proteins have been removed whereby said bone is sterile and non-allergenic, said bone mineral having adsorbed thereon and/or absorbed therein one or more physiologically active substances.

4,882,150

DRUG DELIVERY SYSTEM

Herbert E. Kaufman, 300 Lake Marina Dr., Unit 18E, New Orleans, La. 70124

Division of Ser. No. 202,184, Jun. 3, 1988. This application May 1, 1989, Ser. No. 345,170

Int. Cl.[4] A61K *9/22*

U.S. Cl. 424—428 **10 Claims**

1. Method of treating the eye, comprising:

applying directly to the eye a suspension of at least one particle of bioerodable material including an opthalmic drug in one of a liquid carrier and an ointment carrier containing at least the same opthalmic drug as in said at least one particle of bioerodable material in the same chemical form and having a pH acceptable to the eye.

4,882,151

CONFECTIONERY DELIVERY SYSTEM FOR ANTIHISTIMINES

Robert K. Yang, Randolph; Shri C. Sharma, Mendham; Shan-Shan Sheu, Parsippany, and James J. Shaw, Morristown, all of N.J., assignors to Warner Lambert Co., Morris Plains, N.J.

Division of Ser. No. 811,601, Dec. 20, 1985, Pat. No. 4,778,676. This application Oct. 14, 1988, Ser. No. 258,284

Int. Cl.[4] A61K *9/20, 9/28*

U.S. Cl. 424—440 **14 Claims**

1. A chewable confectionery delivery system for antihistamines comprising:

(a) an antihistamine pre-coated with at least one material selected from the group consisting of lecithin, polyoxyalkylenes having chain lengths of about 4 carbons or less, glycerides having a melting point of 100° C. or less, polyalkyleneglycols having a molecular weight of 3,700 or less, synthetic and natural waxes and mixtures thereof; and

(b) a confectionery matrix comprising a binder system comprising from about 0.1% to about 5% by weight gelatin and a humectant material selected from the group consisting of glycerin and its lower alkyl (C_{2-7}) ester derivatives, a sweetener; and about 1% to about 30% by weight water, all weights are in percent of the final delivery system.

4,882,152

CONFECTIONERY DELIVERY SYSTEM FOR LAXATIVES, VITAMINS AND ANTACIDS

Robert K. Yang, 12 Roc Etam Rd., Randolph, N.J. 07869; Shri C. Sharma, 40 Oak Knoll Rd., Mendham, N.J. 07945; Shan-Shan Sheu, 20 Jean Ter., Parsippany, N.J. 07054, and James J. Shaw, 34 Valley View St., Morristown, N.J. 07960

Division of Ser. No. 811,601, Dec. 20, 1985, Pat. No. 4,778,676. This application Oct. 14, 1988, Ser. No. 258,285

Int. Cl.[4] A61K *9/20, 9/28*

U.S. Cl. 424—440 **13 Claims**

1. A chewable confectionery delivery system for laxatives, vitamins and antacids comprising:

(a) a laxative, vitamin and antacid pre-coated with at least one material selected from the group consisting of lecithin, polyoxyalkylenes having chain lengths of about 4 carbons or less, glycerides having a melting point of 100° C. or less, polyalkyleneglycols having a molecular weight of 3,700 or less, synthetic and natural waxes and mixtures thereof; and

(b) a confectionery matrix comprising a binder system comprising from about 0.1% to about 5% by weight gelatin and a humectant material selected from the group consisting of glycerin and its lower alkyl (C_{2-7}) ester derivatives, a sweetener; and about 1% to about 30% by weight water, all weights are in percent of the final delivery system.

4,882,153

CONFECTIONERY DELIVERY SYSTEM FOR ANTITUSSIVES

Robert K. Yang, Randolph; Shri C. Sharma, Mendham; Shan-Shan Sheu, Parsippany, and James J. Shaw, Morristown, all of N.J., assignors to Warner Lambert Co., Morris Plains, N.J.

Division of Ser. No. 871,601, Dec. 20, 1985, Pat. No. 4,778,676. This application Oct. 13, 1988, Ser. No. 257,604

Int. Cl.[4] A61K *9/20, 9/28*

U.S. Cl. 424—440 **14 Claims**

1. A chewable confectionery delivery system for antitussives comprising:

(a) an antitussive pre-coated with at least one material se-

lected from the group consisting of lecithin, polyoxyalkylenes having chain lengths of about 4 carbons or less, glycerides having a melting point of 100° C. or less, polyalkyleneglycols having a molecular weight of 3,700 or less, synthetic and natural waxes and mixtures thereof; and

(b) a confectionery matrix comprising a binder system comprising from about 0.1% to about 5% by weight gelatin and a humectant material selected from the group consisting of glycerin and its lower alkyl (C_{2-7}) ester derivatives, a sweetener; and about 1% to about 30% by weight water, all weights are in percent of the final delivery system.

4,882,154

CONFECTIONERY DELIVERY SYSTEM FOR MINERAL SUPPLEMENTS

Robert K. Yang, Randolph; Shri C. Sharma, Mendham; Shan-Shan Sheu, Parsippany, and James J. Shaw, Morristown, all of N.J., assignors to Warner Lambert Co., Morris Plains, N.J.

Division of Ser. No. 811,601, Dec. 20, 1985, Pat. No. 4,778,676.
This application Oct. 13, 1988, Ser. No. 257,497
Int. Cl.[4] A61K *9/20, 9/28*
U.S. Cl. 424—440 **14 Claims**

1. A chewable confectionery delivery system for mineral supplements comprising:

(a) a mineral supplement pre-coated with at least one material selected from the group consisting of lecithin, polyoxyalkylenes having chain lengths of about 4 carbons or less, glycerides having a melting point of 100° C. or less, polyalkyleneglycols having a molecular weight of 3,700 or less, synthetic and natural waxes and mixtures thereof; and

(b) a confectionery matrix comprising a binder system comprising from about 0.1% to about 5% by weight gelatin and a humectant material selected from the group consisting of glycerin and its lower alkyl (C_{2-7}) ester derivatives, a sweetener; and about 1% to about 30% by weight water, all weights are in percent of the final delivery system.

4,882,155

CONFECTIONERY DELIVERY SYSTEM FOR ANTIARRHYTHMICS

Robert K. Yang, Randolph; Shri C. Sharma, Mendham; Shan-Shan Sheu, Parsippany, and James J. Shaw, Morristown, all of N.J., assignors to Warner Lambert Co., Morris Plains, N.J.

Division of Ser. No. 811,601, Dec. 20, 1985, Pat. No. 4,778,676.
This application Oct. 14, 1988, Ser. No. 258,243
Int. Cl.[4] A61K *9/20, 9/28*
U.S. Cl. 424—440 **14 Claims**

1. A chewable confectionery delivery system for antiarrhythmics comprising:

(a) an antiarrhythmics pre-coated with at least one material selected from the group consisting of lecithin, polyoxyalkylenes having chain lengths of about 4 carbons or less, glycerides having a melting point of 100° C. or less, polyalkyleneglycols having a molecular weight of 3,700 or less, synthetic and natural waxes and mixtures thereof; and

(b) a confectionery matrix comprising a binder system comprising from about 0.1% to about 5% by weight gelatin and a humectant material selected from the group consisting of glycerin and its lower alkyl (C_{2-7}) ester derivatives, a sweetener; and about 1% to about 30% by weight water, all weights are in percent of the final delivery system.

4,882,156

CONFECTIONERY DELIVERY SYSTEM FOR EXPECTORANTS

Robert K. Yang, Randolph; Shri C. Sharma, Mendham; Shan-Shan Sheu, Parsippany, and James J. Shaw, Morristown, all of N.J., assignors to Warner Lambert Co., Morris Plains, N.J.

Division of Ser. No. 811,601, Dec. 20, 1985, Pat. No. 4,778,676.
This application Oct. 14, 1988, Ser. No. 258,248
Int. Cl.[4] A61K *9/20, 9/28*
U.S. Cl. 424—440 **14 Claims**

1. A chewable confectionery delivery system for expectorants comprising:

(a) an expectorant pre-coated with at least one material selected from the group consisting of lecithin, polyoxyalkylenes having chain lengths of about 4 carbons or less, glycerides having a melting point of 100° C. or less, polyalkyleneglycols having a molecular weight of 3,700 or less, synthetic and natural waxes and mixtures thereof; and

(b) a confectionery matrix comprising a binder system comprising from about 0.1% to about 5% by weight gelatin and a humectant material selected from the group consisting of glycerin and its lower alkyl (C_{2-7}) ester derivatives, a sweetener; and about 1% to about 30% by weight water, all weights are in percent of the final delivery system.

4,882,157

CONFECTIONERY DELIVERY SYSTEM FOR ANTI-CHOLESTEROLEMICS

Robert K. Yang, 12 Roc Etam Rd., Randolph, N.J. 07869; Shri C. Sharma, 40 Oak Knoll Rd., Mendham, N.J. 07945; Shan-Shan Sheu, 20 Jean Ter., Parsippany, N.J. 07054, and James J. Shaw, 34 Valley View St., Morristown, N.J. 07960

Division of Ser. No. 811,601, Dec. 20, 1985, Pat. No. 4,778,676.
This application Oct. 14, 1988, Ser. No. 258,246
Int. Cl.[4] A61K *9/20, 9/28*
U.S. Cl. 424—440 **14 Claims**

1. A chewable confectionery delivery system for anti-cholesterolemics comprising:

(a) an anti-cholesterolemic pre-coated with at least one material selected from the group consisting of lecithin, polyoxyalkylenes having chain lengths of about 4 carbons or less, glycerides having a melting point of 100° C. or less, polyalkyleneglycols having a molecular weight of 3,700 or less, synthetic and natural waxes and mixtures thereof; and

(b) a confectionery matrix comprising a binder system comprising from about 0.1% to about 5% by weight gelatin and a humectant material selected from the group consisting of glycerin and its lower alkyl (C_{2-7}) ester derivatives, a sweetener; and about 1% to about 30% by weight water, all weights are in percent of the final delivery system.

4,882,158

CONFECTIONERY DELIVERY SYSTEM FOR DECONGESTANTS

Robert K. Yang, Randolph; Shri C. Sharma, Mendham; Shan-Shan Sheu, Parsippany, and James J. Shaw, Morristown, all of N.J., assignors to Warner Lambert Co., Morris Plains, N.J.

Division of Ser. No. 811,601, Dec. 20, 1985, Pat. No. 4,778,676.
This application Oct. 14, 1988, Ser. No. 258,247
Int. Cl.[4] A61K *9/20, 9/28*
U.S. Cl. 424—440 **14 Claims**

1. A chewable confectionery delivery system for decongestants comprising:

(a) a decongestant pre-coated with at least one material selected from the group consisting of lecithin, polyoxyalkylenes having chain lengths of about 4 carbons or less, glycerides having a melting point of 100° C. or less, polyalkyleneglycols having a molecular weight of 3,700 or less, synthetic and natural waxes and mixtures thereof; and

(b) a confectionery matrix comprising a binder system comprising from about 0.1% to about 5% by weight gelatin

and a humectant material selected from the group consisting of glycerin and its lower alkyl (C_{2-7}) ester derivatives, a sweetener; and about 1% to about 30% by weight water, all weights are in percent of the final delivery system.

4,882,159

CONFECTIONERY DELIVERY SYSTEM FOR APPETITE SUPPRESSANTS

Robert K. Yang, Randolph; Shri C. Sharma, Mendham; Shan-Shan Sheu, Parsippany, and James J. Shaw, Morristown, all of N.J., assignors to Warner Lambert Co., Morris Plains, N.J.

Division of Ser. No. 811,601, Dec. 20, 1985, Pat. No. 4,778,676. This application Oct. 14, 1988, Ser. No. 258,244

Int. Cl.[4] A61K *9/20, 9/28*

U.S. Cl. 424—440 **14 Claims**

1. A chewable confectionery delivery system for appetite suppressants comprising:

(a) an appetite suppressant pre-coated with at least one material selected from the group consisting of lecithin, polyoxyalkylenes having chain lengths of about 4 carbons or less, glycerides having a melting point of 100° C. or less, polyalkyleneglycols having a molecular weight of 3,700 or less, synthetic and natural waxes and mixtures thereof; and

(b) a confectionery matrix comprising a binder system comprising from about 0.1% to about 5% by weight gelatin and a humectant material selected from the group consisting of glycerin and its lower alkyl (C_{2-7}) ester derivatives, a sweetener; and about 1% to about 30% by weight water, all weights are in percent of the final delivery system.

4,882,160

CONFECTIONERY DELIVERY SYSTEM FOR DICTARY FIBER

Robert K. Yang, Randolph; Shri C. Sharma, Mendham; Shan-Shan Sheu, Parsippany, and James J. Shaw, Morristown, all of N.J., assignors to Warner Lambert Co., Morris Plains, N.J.

Division of Ser. No. 811,601, Dec. 20, 1985, Pat. No. 4,778,676. This application Oct. 13, 1988, Ser. No. 257,603

Int. Cl.[4] A61K *9/20, 9/28*

U.S. Cl. 424—440 **16 Claims**

1. A chewable confectionery delivery system for dietary fiber comprising:

(a) a dietary fiber pre-coated with at least one material selected from the group consisting of lecithin, polyoxyalkylenes having chain lengths of about 4 carbons or less, glycerides having a melting point of 100° C. or less, polyalkyleneglycols having a molecular weight of 3,700 or less, synthetic and natural waxes and mixtures thereof; and

(b) a confectionery matrix comprising a binder syste comprising from about 0.1% to about 5% by weight gelatin and a humectant material selected from the group consisting of glycerin and its lower alkyl (C_{2-7}) ester derivatives, a sweetener; and about 1% to about 30% by weight water, all weights are in percent of the final delivery system.

4,882,161

CHEWABLE, NON-GRITTY CALCIUM CITRATE TABLET

Heinrich P. Scheurer, and Adrian G. McNamee, both of Scarborough, Canada, assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Dec. 31, 1987, Ser. No. 140,014

Int. Cl.[4] A61K *9/28*

U.S. Cl. 424—441 **15 Claims**

1. A non-gritty, chewable, calcium tablet comprising a granulation having a bulk density of about 0.3 g/ml to about 1.5 g/ml, and 300 mg. of calcium said granulation comprising micronized calcium citrate having a particle size from about 0.1 micronmeters to about 10.0 micronmeters, a sweetener and a lubricant.

4,882,162

ARTIFICIAL SKIN

Yoshito Ikada; Shokyu Gen, both of Uji; Shigeo Ohi, Ayabe; Yosuke Urabe, Hiratsuka, and Hiroyuki Kawashima, Ayase, all of Japan, assignors to Dow Corning Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 8, 1988, Ser. No. 242,085

Claims priority, application Japan, Jun. 27, 1987, 62-157500

Int. Cl.[4] A61L *15/04*

U.S. Cl. 424—444 **11 Claims**

1. Artificial skin characteristically consisting of a polymer support film and a woven or knitted fabric formed of fibrous material fixed on said polymer support film, wherein the fabric is prepared from bioabsorbable substance which has an initial strength when formed into a fabric of 90 to 168 grams per fiber and the strength of said fibrous material has been reduced to approximately 30 to 67 grams per fiber of degradative treatment.

4,882,163

TRANSDERMAL THERAPEUTIC SYSTEM

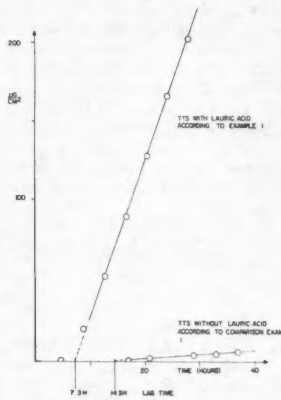
Günter Guse, Hamburg; Michael Horstmann, Neuwied, and Axel Erler, Hamburg, all of Fed. Rep. of Germany, assignors to Beiersdorf Aktiengesellschaft, Hamburg, Fed. Rep. of Germany

Filed Aug. 1, 1988, Ser. No. 226,631

Claims priority, application Fed. Rep. of Germany, Sep. 2, 1987, 3729299

Int. Cl.[4] A61F *13/02*

U.S. Cl. 424—448 **8 Claims**



1. A tansdermal therapeutic system for administration of moxonidine, comprising moxonidine and at least one higher n-alkane carboxylic acid with at least 12 C. atoms as a permeation accelerator.

4,882,164

PARENTERAL MICELLE SOLUTIONS

Alberto Ferro, Riehen, and Hans Steffen, Liestal, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Jan. 19, 1988, Ser. No. 144,997

Claims priority, application Switzerland, Feb. 3, 1987, 380/87

Int. Cl.[4] A61K *37/20;* **G01N** *33/92*

U.S. Cl. 424—450 **9 Claims**

1. Aqueous mixed micelle solutions consisting essentially of a salt of a cholanic acid, a lipid, an effective amount of a non-steroidal anti-inflammatory compound which is a carboxylic acid derivative, wherein the molar ratio between the lipid and the cholanic acid is in the range of from 0.1:1 to 2:1.

4,882,165

LIGHT SENSITIVE LIPOSOMES

Anthony C. Hunt, and Charles Pidgeon, both of San Francisco, Calif., assignors to The Regents of the University of California, Oakland, Calif.

Continuation of Ser. No. 319,294, Nov. 9, 1981, abandoned. This application Nov. 5, 1986, Ser. No. 926,877

Int. Cl.[4] A61K *37/22;* A61J *5/00;* B01J *13/02;* B32B *5/16*

U.S. Cl. 424—450 15 Claims

1. A light sensitive liposome comprising:

a lipid membrane, said lipid membrane encapsulating a fluid, said lipid membrane including a light sensitive lipid in an amount from about 50 wt.% to about 100 wt.% of the lipid membrane and having a polar head region and a nonpolar tail region, said light sensitive lipid including one retinoyl group or two retinoyl groups covalently bonded in the nonpolar tail region of said light sensitive lipid, said light sensitive lipid having an absorptive of light at a predetermined wavelength between about 300 nm to about 400 nm, said light sensitive lipid providing release of said fluid from said lipid membrane in response to an effective amount of irradiation at said predetermined wavelength.

4,882,166

COMPOSITIONS COMPRISING ENCAPSULATED PARTICLES AND THEIR PREPARATION

Neil B. Graham, Bearsden; Abdul Rashid, and Koritala P. Rao, both of Glasgow, all of Scotland, assignors to National Research Development Corporation, London, United Kingdom

Continuation of Ser. No. 840,540, Mar. 17, 1986, abandoned, which is a continuation of Ser. No. 430,360, Sep. 30, 1982, abandoned. This application Aug. 20, 1987, Ser. No. 88,539

Claims priority, application United Kingdom, Sep. 30, 1981, 8129575; Sep. 16, 1982, 8226355

Int. Cl.[4] A61K *9/58;* B01J *13/02*

U.S. Cl. 424—462 40 Claims

1. A composition which comprises at least one particle, the or each particle comprising an active substance-containing solid or liquid core encapsulated by a (co)polymer, which composition is obtained by treating at least one solid or liquid active substance-containing particle by adsorbing thereon at least one amphipathic compound and, if the amphipathic compound is not itself capable of acting as an initiator in cationic polymerization, activating the amphipathic compound with a Bronsted or Lewis acid so that it can function as an initiator in cationic polymerization; and encapsulating the at least one treated particle by the in situ (co)polymerization thereon, in a non-aqueous medium, of at least one cationically polymerizable monomer or prepolymer.

4,882,167

DRY DIRECT COMPRESSION COMPOSITIONS FOR CONTROLLED RELEASE DOSAGE FORMS

Choong-Gook Jang, 12D Jules La., New Brunswick, N.J. 08901

Continuation of Ser. No. 846,579, Mar. 31, 1986, abandoned, which is a continuation-in-part of Ser. No. 600,472, Apr. 16, 1984, abandoned, which is a continuation of Ser. No. 535,604, Sep. 26, 1983, abandoned, which is a continuation-in-part of Ser. No. 499,221, May 31, 1983, abandoned, which is a continuation-in-part of Ser. No. 419,409, Sep. 17, 1982, abandoned, which is a continuation-in-part of Ser. No. 316,993, Nov. 2, 1981, abandoned, which is a continuation-in-part of Ser. No. 147,929, May 8, 1980, abandoned, which is a continuation-in-part of Ser. No. 54,856, Jul. 5, 1979, abandoned, which is a continuation-in-part of Ser. No. 34,580, Apr. 30, 1979, abandoned. This application Nov. 24, 1987, Ser. No. 124,887

Int. Cl.[4] A61K *9/20, 9/22, 9/26*

U.S. Cl. 424—468 32 Claims

1. A dry, direct compressed product containing controlled release dosage forms of therapeutically active particulate agents produced without heat or solvents by the steps comprising: (a) dry blending blend particles, all of which have particle sizes smaller than 20 mesh, consisting essentially of from 0.01 to 95 weight parts of biologically active particulate solids with from 5 to 99.99 weight parts of a matrix blend combination consisting essentially of from 1 to 96 parts by weight of a hydrophobic carbohydrate polymer of the class of ethyl cellulose, propyl cellulose, cellulose acetate, cellulose propionate, cellulose acetatebutryate and cellulose acetate-propionate and from 4 to 99 parts by weight of a digestive-difficulty soluble component of the class consisting of a wax of the class consisting of carnauba wax, spermceti, beeswax, candelilla wax, esparto and paraffins; a fatty acid material of the class consisting of fatty acids having from 12 to 28 carbon atoms, fatty monoalchols having 12 to 28 carbon atoms, fatty amines and amides having from 12 to 28 carbon atoms; a neutral lipid of the class consisting of stearin, palmitin, castorwax, phospholipids, glycolipids, glycerides, hydrogenated cottonseed oil, hydrogenated cottonseed oil, hydrogenated tallow and metal and organic salts of C_{11}–C_{28} fatty acids: and, mixtures thereof; (b) compressing said blended solids and blend under a pressure of 1.5 to 20 tons per square inch; and (c) thereafter, recovering said compressed product having a hardness of 4 to 25 kg and excellent resistance to delamination when subjected to an external longitudinal force.

4,882,168

POLYESTERS CONTAINING ALKYLENE OXIDE BLOCKS AS DRUG DELIVERY SYSTEMS

Donald J. Casey, Ridgefield, and Louis Rosati, Norwalk, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Sep. 5, 1986, Ser. No. 903,801

The portion of the term of this patent subsequent to Dec. 29, 2004, has been disclaimed.

Int. Cl.[4] A61K *31/74;* C08G *63/08*

U.S. Cl. 424—468 15 Claims

1. A slow release drug delivery system comprising

a drug and

an ABA or AB block polymer wherein the (B) block is a poly(alkylene oxide) having an average molecular weight in a range of about 5,000 to about 20,000 and the blocks (A) are comprised of degradable random copolymers of (1) the cyclic ester of an alpha-hydroxy acid and (2) trimethylene carbonate; wherein said block polymer has a glass transition temperature at or less than 16° C.

4,882,169

SWELLABLE PELLETS

Kimon Ventouras, Le Lignon, Switzerland, assignor to Zyma Sa, Nyon, Switzerland

Filed Feb. 2, 1988, Ser. No. 151,502

Claims priority, application United Kingdom, Feb. 3, 1987, 8702411

Int. Cl.[4] A61K *9/16*

U.S. Cl. 424—493 14 Claims

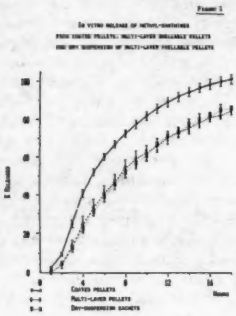
1. Pellets comprising

(a) a core, containing microparticles of at least one pharmaceutically active substance,

(b) optionally one or more coating layer(s) and

(c) an outer layer which rapidly swells and rapidly becomes jellified in contact with water containing a rapidly swelling and rapidly jellifying material selected from the group consisting of xanthan gum and derivatives thereof, guar gum and derivatives thereof, alginates, polysaccharides,

cellulose derivatives, polyvinyl alcohol, pregelatinized starches and swellable acrylic polymers,



which pellets, when contacted with water, are rapidly dispersed so as to generate a viscous, homogeneous suspension that can easily be swallowed.

4,882,170

METHOD OF TREATMENT

Rogelio Menendez, Nashua, N.H., and Kenneth J. Gorelick, Winchester, Mass., assignors to Fisons Corporation, Bedford, Mass.

Filed Mar. 20, 1987, Ser. No. 28,451
Int. Cl.[4] A61K *33/00, 31/35*
U.S. Cl. 424—600 **11 Claims**

1. A method for the inhibition of an allergic reaction or tissue inflammation resulting from the placement of an endotracheal instrument or device, which method comprises the steps of

(a) administration by inhalation of cromolyn sodium to a patient, and

(b) placement of the endotracheal instrument or device, steps (a) and (b) being performed in any order or simultaneously.

4,882,171

VANADIUM-PEROXIDE COMPOSITIONS AS INSULIN MIMICKERS

Barry I. Posner, 125 Geneva Crescent, Town of Mount Royal, Quebec, Canada (H3R 2A7), and I. George Fantus, 4745 Meridian, Westmount, Canada (H3W 2C2)

Filed Oct. 7, 1987, Ser. No. 105,212
Claims priority, application Canada, Oct. 16, 1986, 520627
Int. Cl.[4] A61K *33/24, 33/40*
U.S. Cl. 424—616 **9 Claims**

1. A method of augmenting protein synthesis comprising addition of an effective amount of a composition comprising vanadate in a concentration range of from 10^{-4} to 10 millimolar and of peroxide in a concentration range of from 10^{-1} to 10 millimolar to an environment in which protein synthesis takes place.

4,882,172

SYSTEM FOR PROCESSING CHEWING GUM

Terrance L. Van Alstine, Palatine Bridge, N.Y., assignor to Nabisco Brands, Inc., East Hanover, N.J.

Filed Apr. 8, 1988, Ser. No. 179,467
Int. Cl.[4] B23G *3/30*
U.S. Cl. 425—113 **12 Claims**

1. A system for processing chewing gum composition, comprising:

segment forming means to form the chewing gum into a multitude of segments;

a plurality of extruders to extrude the gum segments into a plurality of ropes;

conveyor means extending from a position adjacent the segment forming means and over a predetermined path past each of the plurality of extruders, to transport the gum segments from said position adjacent the segment forming means and along said predetermined path;

means to feed the gum segments onto the conveyor means from the segment forming means;

means to feed the gum segments from the conveyor means and into the extruders; and

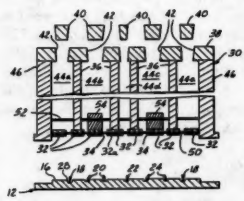
a plurality of wrapping means to receive the ropes from the extruders, to cut each rope into a multitude of pieces and to wrap the pieces.

4,882,173

APPARATUS FOR MOLDING THERMOPLASTIC MATERIAL

Wayne D. LaRoche, Farmington, and John D. Gray, New Durham, both of N.H., assignors to Davidson Textron Inc., Dover, N.H.

Filed Jul. 24, 1987, Ser. No. 77,435
Int. Cl.[4] B29C *31/10, 39/12, 41/18, 41/22*
U.S. Cl. 425—130 **4 Claims**



1. In apparatus for molding decorative features in a base layer of thermoplastic material which is formed by casting dry thermoplastic particles having a fusion temperature against a heated mold surface, the improvement comprising;

a casting mold having a mold surface with recesses formed therein having closed marginal edges defining a decorative feature;

a combined mask and container means connectable with respect to said casting mold; said combined mask and container means including heat resistant foot portions with sealing edges of a form to correspond to said closed marginal edges of said recesses and with end surfaces engageable with said mold to cover said mold surface in surrounding relationship to said recesses to as to prevent fusion of thermoplastic material thereon other than in said recesses;

first distribution means including said combined mask and container means operable to supply a plurality of different colored dry thermoplastic materials and to distribute different colored particles to preselected ones of said recesses when said sealing edges are in alignment with said marginal edges thereof while said end surfaces are masking thermoplastic material from other portions of said mold in surrounding relationship to said recesses;

means for heating said mold surface to a temperature less than said fusion temperature of said thermoplastic material to produce a semi-cured deposit of material in said recesses;

said first distribution means operable to return excess thermoplastic from said heated mold surface when said combined mask and container means is disconnected from said heated mold surface; and

second distribution means for distributing color contrasting base layer of thermoplastic material onto said semi-cured deposit of material for subsequent curing and bonding of

said semi-cured deposit and base layer of thermoplastic material prior to cooling said and stripping said mold.

4,882,174

ARTIFICIALLY EXTENDED NATURAL SEAFOOD BAIT AND METHOD OF MAKING THE SAME

Jay B. Burreson, 1664 N.W. Midlake La., Beaverton, Oreg. 97005; William B. Neels, 4481 S.E. Concord Rd., Milwaukie, Oreg. 97222; Theodore G. Plew, 8351 N.E. Union Ave., Portland, Oreg. 97211, and James H. Borger, 13260 N.W. Overton St., Portland, Oreg. 97229

Continuation-in-part of Ser. No. 852,083, Apr. 14, 1986, abandoned, and a continuation of Ser. No. 707,421, Mar. 1, 1985, abandoned, and a continuation-in-part of Ser. No. 521,617, Aug. 8, 1983, abandoned. This application Jul. 28, 1987, Ser. No. 79,203

Int. Cl.[4] A23K *1/00*

U.S. Cl. 426—1 5 Claims

1. A method of making an artificially extended natural seafood bait for automatic hook baiting and hook cleaning, comprising dispersing throughout a liquified quantity of one or both of the natural bait extending materials gelatin and pectin, a quantity of natural solid fish or seafood bait ground to a particle size of not more than about ¼ inch thick, and a mat of randomly crossed fibers of a fibrous material, and thereafter solidifying the liquid to form a fiber-reinforced artificially extended natural bait suitable for automatic hook baiting and hook cleaning.

4,882,175

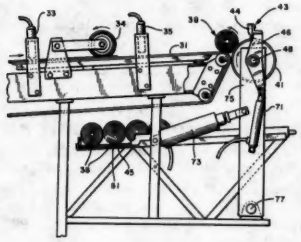
METHOD FOR FORMING A CONFECTIONARY PRODUCT INTO A ROLLED TAPE

Ronald L. Ream, North Aurora; Robert D. Riedy, Naperville, and Michael McHale, Aurora, all of Ill., assignors to Wm. Wrigley Jr. Company, Chicago, Ill.

Filed May 5, 1988, Ser. No. 190,664

Int. Cl.[4] A23G *3/02, 3/30*

U.S. Cl. 426—5 9 Claims



1. A method of forming a confectionary product into a rolled tape comprising the steps of:

providing a mass of chewing gum;

forming said mass into a thin, flat, generally rectangular sheet having a leading edge;

rolling said flat sheet about said leading edge; and

cutting said rolled flat sheet in planes generally perpendicular to said leading edge to thereby produce a plurality of individual pieces of said chewing gum of a predetermined width in the form of a rolled tape.

4,882,176

METHOD FOR MOLDING CONFECTIONERY PRODUCTS

Kazuya Koyama, No. 6-26-16, Minami-Kasai; Edogawa-ku, Tokyo, and Yoshimasa Yokoyama, No. 2-5-3-194, Sumiyoshi-Higashi-machi Higashi-Nada-ku, Kobe, Hyogo-ken, both of Japan

Filed May 2, 1988, Ser. No. 189,309

Claims priority, application Japan, May 2, 1987, 62-109472; Dec. 4, 1987, 62-308030

Int. Cl.[4] A23G *3/30*

U.S. Cl. 426—5 5 Claims

1. In a method of injection molding chewing gum to provide a final product with a detailed molded outer surface, the improvement comprising the steps of:

supplying a mass of chewing gum at a temperature between 122° F. and 140° F. to an injection mold,

freezing the surface interface of the chewing gum contacting the mold, and

ejecting the molded chewing gum product while its surface is in a frozen state, whereby the separation of the chewing gum product from the mold, due to the frozen state of the chewing gum, ensures that the detailed outer surfaces of the chewing gum product are retained.

4,882,177

METHOD FOR THE PRODUCTION OF ALCOHOL-FREE BEER

Klaus Dziondziak, Pinneberg, Fed. Rep. of Germany, assignor to Holsten-Brauerei AG, Hamburg, Fed. Rep. of Germany

Filed May 11, 1987, Ser. No. 47,467

Claims priority, application Fed. Rep. of Germany, May 13, 1986, 3616093

Int. Cl.[4] C12C *11/00*

U.S. Cl. 426—14 17 Claims

1. A method for the production of alcohol free beer which comprises:

(a) aerobically treating a yeast-containing alcoholic beer by leading a gas through said yeast-containing alcoholic beer which contains of from about 0.25 to 1.80% by weight of fermentable substances, in order to desorb said alcohol; and

(b) carrying out said aerobic treatment and said desorption of said alcohol at a temperature of 25° C. to 50° C. until said fermentable substances are present in a residual amount of from about 0.1 to 0.5% by weight;

wherein said fermentable substances partially metabolize producing aromatic substances which give beer its taste and which compensates for the deficit of taste as a result of the removal of said alcohol.

4,882,178

PROCESS FOR PREPARING YEAST RAISED DOUGHNUTS

Akira Shimamura, Kokubunji, Japan, assignor to Nisshin-DCA Foods, Inc., Tokyo, Japan

Filed May 25, 1988, Ser. No. 198,524

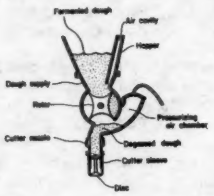
Claims priority, application Japan, Feb. 10, 1988, 58-29939

Int. Cl.[4] A21D *2/02, 8/04*

U.S. Cl. 426—27 1 Claim

1. A process for preparing a yeast raised doughnut, comprising the steps of fermenting a doughnut dough containing yeast and a chemical leavening agent for a fermentation time in the range of 60–110 minutes, degassing the fermented dough,

cutting and forming the degassed dough with a pressure cutter, and then not subjecting the cut dough to final proofing but



immediately frying the cut dough in oil to obtain a yeast raised doughnut.

4,882,179

METHOD OF MANUFACTURE OF CREAMY HAVARTI STYLE CHEESE

James D. Beyer, Gresham, and Mark E. Johnson, Madison, both of Wis., assignors to Wisconsin Milk Marketing Board, Madison, Wis.

Filed Sep. 15, 1988, Ser. No. 245,335
Int. Cl.[4] A23C *19/00*
U.S. Cl. 426—36 **18 Claims**

1. In a method of manufacture of a Havarti cheese comprising the steps of: providing standardized and pasteurized milk; adding mesophilic culture comprising organisms having enzymatic activity; ripening the milk and adding rennet to form a curd; cutting the curd; healing the curd; stirring the curd; removing a volume of whey; adding hot water equal to the volume of whey remove and cooking the curd for a cooking time; second stirring the curd; hooping the curd; turning the hoops; and brining and curing the cheese, with the improvement comprising cooking the curd at a temperature in the range of 104° to 106° F. for a cooking time of about one hour for retarding the culture growth, to restrict the number of the cells, to reduce the bitterness in the cheese and for modifying the enzymatic activity of the organisms while still achieving acid production.

4,882,180

SOYBEAN HYDROLYZATE

Shoji Takao, Higashikurume; Hiroshi Nakashima, Inagi; Makoto Watanabe, Tama; Makoto Saitoh, Aichi; Kyoko Chiba, Musashino, and Kazuo Suzuki, Hachioji, all of Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 22,538, Mar. 3, 1987, abandoned, which is a continuation of Ser. No. 843,597, Mar. 25, 1986, abandoned. This application Aug. 18, 1988, Ser. No. 233,900
Claims priority, application Japan, Mar. 26, 1985, 60-61449
Int. Cl.[4] A23J *3/00*
U.S. Cl. 426—46 **2 Claims**

1. A process for preparing a soybean hydrolyzate, wherein a supernatant obtained by centrifugal separation of the hydrolyzate contains an amino nitrogen content in the amount in the range from 5 to 20% of an amount of total nitrogen contained in the supernatant, which consists of pulverizing soybean, adding water to the pulverized soybean to form a slurry of a solid content in the range of 1 to 20%, heating the slurry at a temperature from 60° to 100° C. for a period in the range from 5 to 180 minutes, homogenizing the heated slurry under a pressure from 100 to 800 kg/cm^2 and hydrolyzing the homogenate with a neutral protease enzyme produced by *Bacillus subtilis* in a sufficient amount of the enzyme to hydrolyze the homogenate.

4,882,181

COCOA BASED COMPOSITION FOR THE PREPARATION OF DRINKS BY DISSOLUTION IN WATER

Claude Giddey, Geneva, and Guy Bunter, Carouge, both of Switzerland, assignors to Battelle Memorial Institute, Geneva, Switzerland

Continuation of Ser. No. 882,522, Jul. 7, 1986, abandoned. This application Feb. 1, 1988, Ser. No. 151,185
Claims priority, application Switzerland, Jul. 9, 1985, 2974/85
Int. Cl.[4] A23G *1/00*
U.S. Cl. 426—74 **9 Claims**

1. A dry power composition of water-soluble solid substances for the preparation of a hot or cold cocoa drink by adding water thereto so as to provide a cocoa drink approximating the taste of milk-based chocolate drinks said composition, comprising by weight 5 to 30 parts of soluble cocoa and 55 to 70 parts of sugar or other sweetening carbohydrates, with additional ingredients to make 100% by weight including a mixture of mineral salts which comprises the following salts; in % by weight: KCl 7–10; KH_2PO_4 18–24; K_2CO_3 3–5; K_2SO_4 2–3; tripotassium citrate 14–18; trisodium citrate 20–26; $CaCl_2$ 15–19; and $MgCl_2$ 7–11, this mixture providing a buffering action at pH 5.8–6.5 when the composition is dissolved for preparing the drink.

4,882,182

AEROSOL PRODUCT

Neil G. Halls, and Roderick P. J. Tomlinson, both of Glen Waverley, Australia, assignors to Soltec Research Pty. Ltd., Australia

Filed Jul. 6, 1987, Ser. No. 69,893
Claims priority, application Australia, Jan. 8, 1987, PH9795
Int. Cl.[4] A23B *4/14*; A23C *3/08*
U.S. Cl. 426—116 **19 Claims**

1. An aerosol dispensable composition comprising in combination:

(i) 0.05 to 5% w/w of a frothing agent;
(ii) 0.05 to 75% w/w of a sweetener;
(iii) 0.05 to 10% w/w of a thickener;
(iv) at least one additive selected from the group consisting of an acidic flavouring agent and an acidic colourant;
(v) a propellant;
(vi) water; and
(vii) a sufficient amount of a phosphate buffer system to maintain the pH of the composition in the range 8.0 to 8.5;

said composition having a shelf life of at least 12 months at ambient temperature in a corrosible metallic or metal lined container.

4,882,183

METHOD FOR PRODUCTION OF OXIDE FILM

Juichi Ino; Akihiro Hishinuma; Hirotsugu Nagayama, and Hideo Kawahara, all of Osaka, Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan

Filed Apr. 6, 1988, Ser. No. 178,154
Claims priority, application Japan, Aug. 27, 1987, 62-213624; Jan. 11, 1988, 63-3451
Int. Cl.[4] B05D *5/12*
U.S. Cl. 427—126.6 **30 Claims**

1. A method for the production of an oxide film on a surface of a substrate, comprising:

preparing a treating liquid containing fluorine and at least one metal member selected from the group consisting of Sn, Zr, Zn, In, V, Cr, Mn, Fe, Co, Ni and Cu, said treating liquid containing the oxide of said selected metal dissolved therein to supersaturation, and

contacting the substrate with the treating liquid to form an oxide film on the surface of the substrate.

4,882,184

PROCESS FOR MICROWAVE BROWNING AND PRODUCT PRODUCED THEREBY

Lawrence Buckholz, Middletown; Brian Byrne, East Brunswick, and Marion Sudol, Boonton, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Jan. 10, 1989, Ser. No. 295,450
Int. Cl.[4] A21D *6/00*; A23L *1/272*
U.S. Cl. 426—243 2 Claims

1. A process for providing a cooked baked goods foodstuff comprising the steps of:

(a) providing an uncooked baked goods composition having a continuous surface;

(b) providing a mixture of:

(i) proline;

(ii) a sugar selected from the group consisting of rhamnose and ribose; and

(iii) a solvent which is a mixture of glycerine and ethyl alcohol;

wherein the mixture of ethyl alcohol and glycerine is in an amount sufficient to be capable of raising the dielectric constant of the surface of the foodstuff to be cooked whereby the foodstuff to be cooked is completely cooked in a period of time under 120 seconds;

(c) coating the mixture of (b) onto the surface of the uncooked foodstuff provided in (a); and

(d) exposing the thus coated uncooked foodstuff to microwave radiation for a period of time between 40 seconds and 120 seconds,

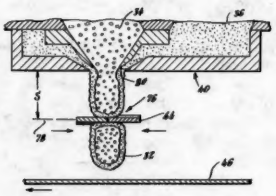
with the pH of the coating mixture being in the range of from about 9 up to about 13.

4,882,185

METHOD AND APPARATUS FOR SEVERING A COEXTRUSION FOR MAKING AN ENROBED FOOD PIECE

William J. Simelunas, Glen Rock; Nicholas R. Polifroni, Cliffside Park; Henry N. Sholket, Rutherford, and Stefan M. Meyer, Lyndhurst, all of N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.

Continuation of Ser. No. 507,469, Jun. 24, 1983, abandoned.
This application Oct. 13, 1987, Ser. No. 110,027
Int. Cl.[4] A21C *11/10*; A21D *13/00*
U.S. Cl. 426—283 10 Claims



1. A method for the continuous production of individual food pieces of coextruded foods at a food station where the food pieces are transported away by a conveyor comprising the steps of:

coextruding from a die said inner food with and inside said outer food in a downwardly direction so as to form a coextrusion below the die;

horizontally severing the coextrusion while it is unsupported from below at a place which is a predetermined distance below the die with a pair of bluntly-shaped elements that move in a horizontal plane and overlap each other at the severing place so as to simultaneously draw the outer food both above and below the severing place over the inner food to form food pieces having the inner food enrobed by the outer food and dropping the severed food pieces from said place onto the conveyor;

periodically varying the rate of flows of the inner and outer foods relative to each other so as to produce in said coextrusion at said predetermined distance below the die a relatively greater amount of outer food; and

severing the coextrusion near said greater amount of food to enhance the enrobing of the inner food.

4,882,186

PROCESS FOR PRODUCING A MALT BEVERAGE HAVING IMPROVED FOAMING PROPERTIES AND PRODUCT PRODUCED THEREFROM

Joseph L. Owades, 2164 Hyde St., San Francisco, Calif. 94109

Filed Jan. 25, 1989, Ser. No. 301,619
Int. Cl.[4] C12C *5/02*
U.S. Cl. 426—329 9 Claims

1. A method of improving the foaming properties of a brewed malt beverage during brewing which comprises adding to the malt beverage prior to or following fermentation about 0.01 to about 0.1 lb. of ginseng per bbl. of malt beverage.

4,882,187

EDIBLE SPREAD AND PROCESS FOR THE PREPARATION THEREOF

Henry J. Izzo, Bridgewater; Stephen M. Pincus, Marlboro; Jane B. Theller, Harrington Park, and Michael C. Cirigliano, Bergenfield, all of N.J., assignors to Thomas J. Lipton Inc., Englewood Cliffs, N.J.

Filed Jul. 2, 1987, Ser. No. 69,058
Int. Cl.[4] A23D *3/00*
U.S. Cl. 426—335 61 Claims

47. A method for preparing a low fat butter spread which comprises:

(a) providing a butter of pumpable plastic consistency, the butter comprising a continuous phase of butter fat and having a discontinuous aqueous butter serum phase having a pH above 4.7;

(b) combining a stream of the butter with a stream of aeons gelatin solution having a pH at or below 4.7 to provide a product stream of butter and gelatin solution, the product stream having a fat content, by weight, of 26% to 65%;

(c) forming a stable dispersion of the gelatin solution as droplets in a continuous phase of the butter at of the butter, without substantial change to the discontinuous aqueous butter serum phase; and

(d) allowing the dispersion to set to form a low fat butter spread.

4,882,188

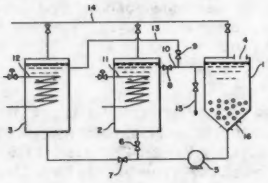
PROCESS FOR PREPARING HEAT TREATED GRANULAR SOLID FOOD

Hiroshi Sawada, Osaka, Japan, and Richard L. Merson, Davis, Calif., assignors to Nakamura & Partners, Tokyo, Japan

Continuation of Ser. No. 767,528, Aug. 20, 1985, abandoned.
This application May 2, 1988, Ser. No. 191,813
Claims priority, application Japan, Feb. 22, 1985, 60-33909
Int. Cl.[4] A23L *1/00*, *3/16*
U.S. Cl. 426—438 8 Claims

1. A process for preparing aseptically a heat treated granular solid food in a batch operation, comprising feeding a granular solid food having a granule diameter of from 3 to 45 mm through a charging port into a sealable processing vessel with a funnel-shaped bottom to form a bed of said granular solid food, then closing the charging port, while supplying aseptic air into the processing vessel to raise the pressure in the vessel, then supplying a liquid heating medium, which is separately heated in a heating tank, from the bottom of the processing vessel into said processing vessel at flow rate such that the void fraction of said bed of said granular solid food becomes 0.38 to 0.8 sufficient to subject said granular solid food to heat treatment at a temperature of more than 100° C. in a fluidized

condition for a time sufficient to effect sterilization of said granular solid food uniformly at the center portion of each granule, and subsequently supplying a liquid cooling medium, which is separately cooled in a cooling tank, from the bottom



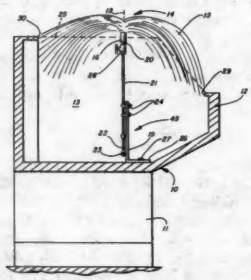
of the processing vessel into said processing vessel at a flow rate such that the void fraction of said bed is held within 0.38 to 0.8 sufficient to cool said granular solid food in a fluidized condition.

4,882,189

METHOD OF SPRAYING WATER MIST ONTO PRODUCE IN A DISPLAY CASE

John E. Corrigan, Glenview, Ill., assignor to Carrot Top Inc., Northbrook, Ill.

Filed Jul. 11, 1988, Ser. No. 217,317
Int. Cl.[4] A23L *1/212*
U.S. Cl. 426—506 **13 Claims**



1. The method of providing mist onto produce provided in a display case comprising the steps of:

positioning an upwardly directed misting spray nozzle at a preselected portion of the case;

intermittently connecting said spray nozzle to a source of pressurized water; and

causing the spray nozzle to provide water mist onto produce in the case during a time when the spray nozzle is connected to the source of pressurized water in an expanding and contracting spray pattern extending upwardly from the nozzle to a preselected maximum vertical distance thereabove, and laterally from the nozzle to a preselected maximum horizontal distance therefrom at least approximately twice said vertical distance.

4,882,190

METHOD OF PRODUCING SULFITE-FREE SUGARBEET PULP

Roland F. Olson, Fargo, N. Dak., and Richard R. Fergle, Moorhead, Minn., assignors to American Crystal Sugar Company, Moorhead, Minn.

Filed Dec. 8, 1987, Ser. No. 130,086
Int. Cl.[4] A23B *7/00, 7/10;* A23J *1/14*
U.S. Cl. 426—541 **11 Claims**

1. A method of producing sulfite-free sugarbeet pulp, said method comprising the steps of:

(a) slicing a sugarbeet into a plurality of pieces; and,

(b) contacting the sugarbeet pieces with an effective sugar extracting amount of a sulfite-free aqueous solution containing at least a food-grade non-sulfite antioxidant composition, so as to produce sugarbeet pulp suitable for human consumption;

(i) said non-sulfite antioxidant composition comprising a non-sulfite antioxidant compound selected from the group consisting of sodium erythorbate, araboascorbic acid, and mixtures thereof;

(ii) said non-sulfite antioxidant composition further comprising a non-sulfite additive selected from the group consisting of trisodium citrate, calcium chloride, citric acid, and mixtures thereof; and,

(iii) said non-sulfite antioxidant composition including about 72 to 78 wt-% sodium erythorbate, about 20 to 27 wt-% trisodium citrate, and about 1 to 5 wt-% calcium chloride.

4,882,191

METHOD OF MAKING LONG-TERM PRESERVATION COOKED PASTA PRODUCTS READY FOR CONSUMPTION

Giuseppe Bastetti, and Sergio Veronesi, both of Milan, Italy, assignors to Barilla G.E R. F.LLI - Societa per Azioni, Parma, Italy

Filed Dec. 24, 1987, Ser. No. 137,702
Claims priority, application Italy, Sep. 25, 1987, 22042 A/87
Int. Cl.[4] A23L *1/16*
U.S. Cl. 426—557 **8 Claims**

1. A method of making long-term preservation cooked pasta products ready for consumption, comprises the following steps, to be all carried out in a sterile environment:

sterilizing a pasta product having a moisture content within the range of 20% to 30% by means of substantially dry steam;

cooking the thus sterilized pasta product in a suitable amount of cooking water;

removing all of the cooking water from the pasta product thus sterilized and cooked; and

packaging metered amounts of said sterilized and cooked pasta product inside sealed containers.

4,882,192

HARD BUTTER COMPOSITION

Hirokazu Maeda, Sakai; Mayumi Yamaguchi, Izumisano; Tetsuya Uchiyama; Hideki Baba, both of Sennan; Hidenobu Matsunami, Sennan; Yoshitaka Ebihara, Yao, and Junji Kanegae, Iwatsuki, all of Japan, assignors to Fuji Oil Company, Limited, Osaka, Japan

Filed Mar. 31, 1988, Ser. No. 176,181
Claims priority, application Japan, Apr. 3, 1987, 62-83501
Int. Cl.[4] A23D *5/02*
U.S. Cl. 426—607 **1 Claim**

1. A hard butter composition which comprises at least 85% by weight of a triglyceride component and at most 15% by weight of a non-triglyceride component based on the total weight of said composition;

said triglyceride component containing

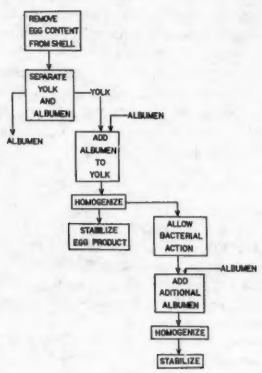
(a) at most 5% by weight of tri-saturated glycerides,

(b) 20 to 65% by weight of triglycerides having one unsaturated bond in one molecule,
(c) at most 30% by weight of triglycerides having two unsaturated bonds in one molecule, and
(d) 10 to 70% by weight of triglycerides having at least three unsaturated bonds in one molecule, based on the total amount of said triglyceride component;
said triglycerides having one unsaturated bond in one molecule (b) containing
(i) 50 to 95% by weight of 2-oleo-1,3-distearin,
(ii) at most 20% by weight of 2-oleo-1-palmito-3-stearin,
(iii) at most 30% by weight of 2-oleo-1,3-dipalmitin, and
(iv) at most 20% by weight of 1,2-saturated-3-unsaturated glycerides, based on the total amount of said triglycerides (b);
said triglycerides having two unsaturated bonds in one molecule (c) containing at most 40% by weight of 1-stearo-2,3-diolein based on the total amount of said triglycerides (c); and
SFI of said composition being
at most 65% at 5° C.,
20 to 55% at 30° C.,
2 to 35% at 35° C.,
at most 3% at 40° C., and
difference between SFI at 5° C. and that of 25° C. being at most 15%.

4,882,193
PROCESS FOR PRODUCING A LOW FAT CONTENT EGG PRODUCT

Richard F. Carrott, Moorpark, Calif., assignor to The Careau Group, Moorpark, Calif.

Filed Jul. 25, 1988, Ser. No. 221,965
Int. Cl.[4] A23L *1/32*
U.S. Cl. 426—614 **12 Claims**



1. A process fro producing a low fat content egg product, said process comprising:
(a) producing eggs having an overly rich color which is darker than the normal egg color and an egg taste which is much stronger than a normal egg taste,
(b) removing the egg contents from the shells of the eggs,
(c) separating the egg yolks from the albumen,
(d) adding albumen from the same eggs or other eggs to the egg yolks and forming a blend thereof and which albumen is added in an amount to dilute the color to that of a normal yellow color of a normally produced egg and to dilute the taste to that of a normal egg, the albumen also being added in an amount to dilute the fat content such that the egg product thus produced has a substantially lesser fat content than a normal egg, and
(e) causing the egg product to remain in an environment of room temperature or greater than room temperature for a selected time to cause bacterial action on the egg product thereby further strengthening the taste and darkening the color, and
(f) addding additional albumen to the bacterial affected blend to further dilute the color and the taste to that of a normal egg.

4,882,194
LIQUID EGG COMPOSITIONS CONTAINING STORAGE-STABLE SOLIDS

Harold Rapp, Fairfield, Conn., assignor to Nabisco Brands, Inc., East Hanover, N.J.

Continuation of Ser. No. 846,473, Mar. 31, 1986, abandoned, which is a continuation of Ser. No. 568,365, Jan. 5, 1984, abandoned. This application Oct. 29, 1987, Ser. No. 115,552
Int. Cl.[4] A23B *5/04;* A23C *23/00;* A23L *1/32*
U.S. Cl. 426—614 **21 Claims**

1. A method for preparing and storing in a stable condition a liquid egg composition containing a multiplicity of discrete solid cheese pieces, which composition provides after storage for a least one week, a liquid egg base containing discrete solid pieces of cheese comprising:
a. preparing a cookable, storage-stable liquid egg composition comprising about 20% to 100% by weight egg white, 0 to about 1% by weight gum, 0 to about 10% by weight nonfat dry milk solids, 0 to about 15% by weight oil, and 0 to about 5% by weight colorant;
b. adding a multiplicity of discrete solid cheese pieces to said liquid egg composition, said cheese pieces having a moisture index of about 3 or less and a melt index of about 1 or less and said cheese pieces comprising about 30–45% by weight water, about 15–25% by weight fat, about 15–25% by weight protein and about 0–5% by weight salt;
c. cooling said composition prepared in accordance with steps (a) and (b) to refrigerator temperatures and maintaining said composition at said temperature for at least about 7 days, and;
d. removing said egg and cheese composition from said refrigerator temperatures, to provide a liquid egg base containing discrete solid pieces of said cheese, wherein said liquid egg base is cookable to a food product comprised of cooked egg having discrete softened or melted cheese disposed therein.

4,882,195
METHOD FOR LABELING AN OBJECT FOR ITS VERIFICATION

Charles L. Butland, Marina Del Rey, Calif., assignor to Print-Lock Corp., Playa Del Rey, Calif.

Continuation-in-part of Ser. No. 857,929, Apr. 30, 1986, abandoned. This application May 30, 1986, Ser. No. 868,955
Int. Cl.[4] A61B *5/10;* B41M *3/14*
U.S. Cl. 427—1 **2 Claims**

1. Method for labeling a work of art for its identification which comprises
applying a selected person's fingerprint to said work of art at a predetermined location upon said work of art.
exposing said pre-determined location to a vaporous agent comprising vapors of a cyanoacrylate ester, said selected person's fingerprint or said vapors of cyanoacrylate ester bearing a detectable amount of an ultra-violet radiation sensitive dye, said exposing thereby creating a permanent impression of said fingerprint on said work of art which impression is perceptible only in the presence of UV radiation.

4,882,196

PROCESS FOR THE PRODUCTION OF A TITANIUM COMPOSITE MATERIALS COATED WITH CALCIUM PHOSPHATE COMPOUND

takayuki Shimamune, Tokyo; Masashi Hosonuma, and Yukiei Matsumoto, both of Kanagawa, all of Japan, assignors to Permelec Electrode Ltd., Kanagawa, Japan

Filed Mar. 24, 1987, Ser. No. 29,519
Claims priority, application Japan, Mar. 24, 1986, 61-64012; Mar. 24, 1986, 61-64013; Mar. 28, 1986, 61-70504
Int. Cl.[4] C23C *22/00, 28/04*
U.S. Cl. 427—2 8 Claims

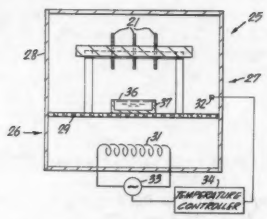
1. A process for producing a titanium composite material, which comprises activating the surface of a titanium or titanium alloy substrate, coating a hydrochloric or nitric acid aqueous solution of a calcium phosphate compound, said solution containing at least one substance selected from titanium, titanium compounds, tin, and tin comopunds, on the activated surface of the substrate, calcining the coating to form a base layer of the calcium phosphate compound on the substrate, thereafter coating a suspension of a calcium phosphate compound on the base layer, and sintering the coating to form a covering layer of the calcium phosphate compound.

4,882,197

METHOD FOR DEPOSITING A LUBRICANT LAYER TO MANUFACTURE A MAGNETIC RECORDING MEDIUM

Takeo Matsudaira, and Hisanori Suzuki, both of Tokyo, Japan, assignors to Hoya Corporation, Tokyo, Japan

Filed Feb. 29, 1988, Ser. No. 162,023
Claims priority, application Japan, Feb. 28, 1987, 62-45471
Int. Cl.[4] B05D *5/12*
U.S. Cl. 427—8 13 Claims



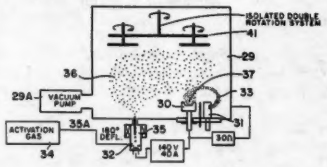
1. A method of manufacturing a magnetic recording medium by depositing a lubricant layer on a protection layer of a magnetic base, said method comprising the steps of:
preparing a chamber which defines a hollow space therein;
locating a temperature sensor in said hollow space;
filling a vessel with a lubricant for forming said lubricant layer;
introducing said vessel filled with lubricant together with said magnetic base into said hollow space;
heating said lubricant to form a lubricant vapor which is deposited onto said protection layer;
sensing, by said temperature sensor, the temperature outside said vessel in said hollow space, and
maintaining the temperature in said hollow space substantially constant.

4,882,198

SYSTEM AND METHOD FOR VACUUM DEPOSITION OF THIN FILMS

Michael D. Temple; Richard I. Seddon, both of Santa Rosa, and Kim L. Johnson, Carlsbad, all of Calif., assignors to Optical Coating Laboratory, Inc., Santa Rosa, Calif.

Division of Ser. No. 935,292, Nov. 26, 1986, Pat. No. 4,777,908. This application Jun. 3, 1988, Ser. No. 202,830
Int. Cl.[4] B05D *3/06, 3/14;* C23C *14/00*
U.S. Cl. 427—38 10 Claims



1. In a method for depositing thin film coatings, the steps of:
disposing a substrate in a vacuum chamber;
disposing in said vacuum chamber at least a first source of evaporant material within an electrically conducting container with line of sight from said material to said substrate;
generating an intense plasma of a selected activation gas species in at least one separate chamber in communication with said vacuum chamber to fill said vacuum chamber with a generally distributed plasma;
coupling said intense plasma and said container in an electrical circuit for current flow therebetween both through said distributed plasma within said chamber and directly through circuit connections outside said chamber;
creating a magnetic field of preconfigured characteristics in the region above said container;
heating said source of evaporant material to evaporate the same and thereby forming an intense second plasma region in said magnetic field above said container through which said evaporant material passes and is activated and then deposits on said substrate.

4,882,199

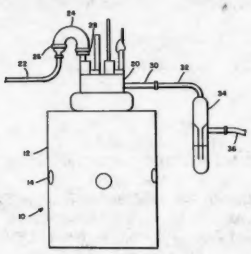
METHOD OF FORMING A METAL COATING ON A SUBSTRATE

Donald R. Sadoway, Belmont, Mass., and Rana P. Singh, White Fish Bay, Wis., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation-in-part of Ser. No. 897,116, Aug. 15, 1986, abandoned. This application Oct. 13, 1987, Ser. No. 108,166
Int. Cl.[4] C23C *2/04*
U.S. Cl. 427—53.1 21 Claims

1. A method for producing a metal coating on a substrate comprising:
(a) selecting a first metal to be coated onto the substrate wherein said metal is soluble in a molten salt when heated to a first temperature, said metal and molten salt being selected from the group consisting of Mn-$MnCl_2$/NaCl, Ag-AgCl/NaCl, Mo-K_3MoCl_6/KCl, Mg-$MgCl_2$, Ca-$CaCl_2$, Al-Na_3AlF_6, Na-NaCl, Si-K_2SiF_6/KF, Ta-$TaCl_5$, Cd-$CdCl_2$, Cu-$CuCl_2$, Sr-$SrCl_2$, Ba-$BaCl_2$, Y-YF_3, Sc-ScF_3, Bi-$BiCl_3$, Al-$AlCl_3$/KCl, Au-$AuCl_3$, Au-$Au(CN)_2$, lanthanide series metals-lanthanide salts, and actinide series metals-actinide salts,
(b) heating a bath of said metal and molten salt to the first temperature to dissolve said metal,
(c) placing the substrate to be coated in the bath, and

(d) decreasing the temperature of the bath at the substrate to a second temperature, wherein the dissolved metal precip-



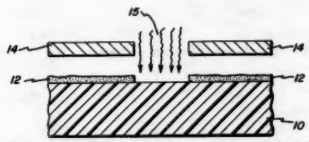
itates out of the molten salt onto the substrate at the second temperature.

4,882,200

METHOD FOR PHOTOPATTERNING METALLIZATION VIA UV-LASER ABLATION OF THE ACTIVATOR

Yung S. Liu, Scotia, and Willard T. Grubb, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 52,295, May 21, 1987, abandoned. This application Aug. 23, 1988, Ser. No. 237,638
Int. Cl.[4] B05D *3/06, 5/12, 3/04;* B44C *1/22*
U.S. Cl. 427—53.1 34 Claims



17. The method for forming conductive patterns on a polymer substrate, said method comprising the steps of:

coating said substrate with an electroless plating activator material;

selectively exposing said substrate and said electroless plating activator material thereon to an ultraviolet laser beam which is sufficiently powerful to ablate said activator material; and

then immersing said substrate in an electroless plating bath for a time sufficient to deposit conductive material on the activator material which was not ablated.

4,882,201

NON-TOXIC ARYL ONIUM SALTS, UV CURABLE COATING COMPOSITIONS AND FOOD PACKAGING USE

James V. Crivello, Clifton Park, and Julia L. Lee, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 21, 1988, Ser. No. 171,063
Int. Cl.[4] B05D *3/06*
U.S. Cl. 427—54.1 9 Claims

1. A non-toxic method for coating a substrate which comprises:

(1) treating the surface of the substrate with a solventless photocurable mixture comprising by weight

(A) A non-toxic oxirane containing silicone or organic resin

(B) An effective amount of a non-toxic arylonium salt selected from the class consisting of diaryliodonium salts and triarylsulfonium salts

(2) Irradiating the treated substrate of (1) with actinic or visible light, until a tack-free surface is obtained on the substrate,

where the arylonium salt is selected from the class consisting of hexafluorophosphates, hexafluoroarsenates and hexafluoroantimonates and at least one of the aryl radicals of the arylonium hexafluorometalloid salt has a nuclear bound —OR group attached to the aryl nucleus by a carbon-oxygen linkage, where R is an alkyl radical having at least 8 carbon atoms.

4,882,202

USE OF IMMERSION TIN AND TIN ALLOYS AS A BONDING MEDIUM FOR MULTILAYER CIRCUITS

Abraham M. Holtzman, Bat Yam, and Joseph Relis, Ramat Gan, both of Israel, assignors to Techno Instruments Investments 1983 Ltd., Bat-Yam, Israel

Division of Ser. No. 770,842, Aug. 29, 1985, Pat. No. 4,715,894. This application Oct. 21, 1987, Ser. No. 110,927
Int. Cl.[4] B05D *5/12*
U.S. Cl. 427—98 18 Claims

1. A process for improving the adhesion properties of a metal layer of a circuit board to a non-conductive surface of a circuit board comprising coating said layer with an immersion metal composition, said immersion metal composition comprising:

(a) a thiourea compound

(b) a urea compound

(c) a metal salt

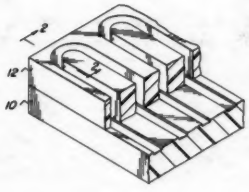
said metal salt being selected from the group of salts based on the Group IVA metals including tin, Group VIII metals, Group IB metals, Group IIB metals and Group IIIA metals, said urea compound and thiourea compound each being present in an amount sufficient to enable said composition to function as an immersion composition.

4,882,203

HEATING ELEMENT

Warner H. Witmer, Bethlehem, Pa., assignor to CVD Systems & Services, Quakertown, Pa.

Filed Nov. 4, 1988, Ser. No. 267,538
Int. Cl.[4] H01L *21/02*
U.S. Cl. 427—124 22 Claims



1. A process for fabricating a heating element comprising the following steps:

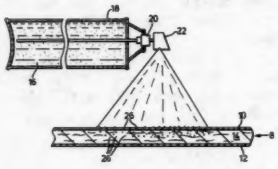
a. surface protecting a silicon object by forming a protective SiO_2 layer by means of thermal oxidation;
b. etching away said protective layer so as to form wire-like regions for a desired heater pattern;
c. exposing the silicon object to a tungsten halogen gas at a temperature of between 250° and 500° centigrade so as to form a layer of tungsten on the exposed silicon object by chemical reduction; and
d. coating the composite structure with an amorphic silicon layer for corrosion and oxidation protection.

4,882,204

DIAPER SPRAY

Harvey Tenenbaum, 305 Woodland Acres, Maple, Ontario, Canada

Filed Jul. 1, 1988, Ser. No. 195,668
Claims priority, application Canada, May 5, 1988, 566056
Int. Cl.[4] B05D *1/12*
U.S. Cl. 427—180 6 Claims



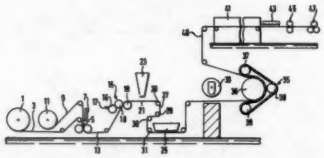
1. A method of increasing the absorbency of a diaper, said diaper being of the kind having an inner porous skin-facing layer, a water resistant outer layer, and an absorbent layer therebetween, said method comprising:
(a) selecting a finely divided absorbent powder,
(b) spraying said powder onto said diaper,
(c) the speed imparted to said powder during said step (b) being sufficiently high that a portion of said powder penetrates said skin-facing layer of said diaper and lodges within said absorbent layer of said diaper.

4,882,205

PROCESS AND APPARATUS FOR THE MANUFACTURE OF FLOOR OR WALL COVERINGS INCORPORATING PEBBLES, AND THE PRODUCT OBTAINED THEREFROM

Gerard Valenduc, L-Wiltz, Luxembourg, assignor to Eurofloor S.A., Luxembourg

Filed Jul. 1, 1987, Ser. No. 69,369
Claims priority, application Luxembourg, Jul. 8, 1986, 86504
Int. Cl.[4] B05D *1/36*
U.S. Cl. 427—204 12 Claims



1. Process for the manufacture of synthetic coverings including the steps of:
depositing a layer of plastisol onto a substrate; depositing a plurality of discrete particles into said plastisol layer;
depositing a powder containing fusible particles compatible with said plastisol coated substrate and said discrete particles;
heat treating said deposited layers at a temperature below the distortion temperature of said substrate to thereby set said deposited materials; and
heating said powder to melt said fusible particles.

4,882,206

CHEMICAL VAPOR DEPOSITION OF GROUP IIIB METALS

Ahmet Erbil, Atlanta, Ga., assignor to Georgia Tech Research Corporation, Atlanta, Ga.

Filed Jun. 22, 1988, Ser. No. 210,020
Int. Cl.[4] B05D *3/02*
U.S. Cl. 427—229 14 Claims

1. A process for depositing a metallic coating on a heated substrate by chemical vapor decomposition of an organometallic compound, said process comprising contacting an organometallic compound of the formula (I)

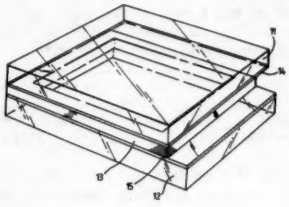
where M is a Group IIIB metal or a mixture thereof and R is an alkyl or alkenyl radical containing from 2 to about 6 carbon atoms, with said heated substrate, said substrate being at a temperature above the decomposition temperature of said organometallic compound.

4,882,207

FERROELECTRIC LIQUID CRYSTAL CELLS

David Coates, Wimborne, and Matthew F. Bone, Bishop's Stortford, both of Great Britain, assignors to STC Plc, London, England

Filed Oct. 28, 1987, Ser. No. 114,298
Claims priority, application United Kingdom, Oct. 28, 1986, 8625771; Dec. 15, 1986, 8629904
Int. Cl.[4] C09K *19/02*
U.S. Cl. 428—1 3 Claims



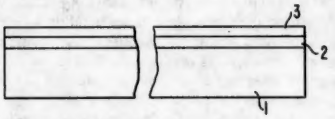
1. A ferroelectric liquid crystal cell having a liquid crystal layer contained within an envelope, in which cell, for the promotion of parallel alignment of the molecules of the liquid crystal layer at at least one of its two major surfaces, at least one of said major surfaces is in contact with an associated polymer layer having a molecular structure with flexible side chains of sufficient length and flexibility to provide no preferential azimuthal direction of alignment for the molecules of the liquid crystal layer in contact therewith.

4,882,208

MULTILAYER COMPOSITE SHEET, ESPECIALLY FOR USE AS A PADDING LAYER UNDER ARTIFICIAL GRASS

Hans-Ulrich Breitscheidel, Siegburg; Rudolf Kautz, Hennef, and Karl-Heinz Sandermann, Lemgo, all of Fed. Rep. of Germany, assignors to Huels Troisdorf AG, Troisdorf and Balsam Sportstattenbau & Co. KG, Steinhagen, both of, Fed. Rep. of Germany

Filed May 26, 1988, Ser. No. 199,144
Claims priority, application Fed. Rep. of Germany, May 27, 1987, 3717880
Int. Cl.[4] B32B *3/02, 33/00*
U.S. Cl. 428—17 10 Claims



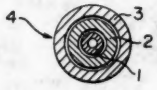
1. A multilayer composite sheet for use as a padding layer underneath an artificial grass layer which comprises a bottom layer of closed-cell crosslinked polyethylene foam material and an upper layer of a metallic layer; said upper layer being bonded to the bottom layer via an intermediate layer.

4,882,209

GLASS CAPILLARY TUBE AND METHOD FOR ITS PRODUCTION

Tsutomu Maruyama; Hidetoshi Matsumoto, and Yoshiyuki Miyake, all of Yokohama, Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan

Filed Sep. 1, 1987, Ser. No. 91,779
Claims priority, application Japan, Sep. 11, 1986, 61-212606
Int. Cl.[4] B32B *17/06*
U.S. Cl. 428—34.1 2 Claims



1. A glass capillary tube obtained by drawing under heating a multiple tube assembly comprising a plurality of glass tubes having different diameters arranged coaxially one in another and simultaneously integrating the glass tubes by heat fusion, wherein the ratio of the outer diameter to the inner diameter of the capillary tube is at least about 5, and wherein the outermost glass tube in the multiple tube assembly has a thermal expansion coefficient smaller than the thermal expansion coefficient of the inner glass tube adjacent to the outermost glass tube.

4,882,210

GLASS CONTAINER

Val G. Romberg, Upper Darby; Patty H. Kiang, Collegeville; Wayne T. Curry, Pottstown, and Ralph E. Pfister, Wayne, all of Pa., assignors to The West Company, Phoenixville, Pa.

Filed Sep. 26, 1988, Ser. No. 248,935
Int. Cl.[4] B65D *23/00*; B32B *17/06*
U.S. Cl. 428—34.7 10 Claims

1. A container for use with a closure, comprising a glass container having an access opening for a closure and a crush strength increasing polyparaxylylene coating on at least one side of said glass container at a thickness of at least 0.1 to about 5 microns.

4,882,211

PAPER PRODUCTS WITH RECEPTIVE COATING FOR REPOSITIONABLE ADHESIVE AND METHODS OF MAKING THE PRODUCTS

Timothy J. McIntyre, Florissant, Mo., and Walter G. Greig, Lewiston, N.Y., assignors to Moore Business Forms, Inc., Grand Island, N.Y.

Filed Aug. 3, 1988, Ser. No. 227,552
Int. Cl.[4] B32B *7/06, 7/10, 7/12, 7/14*
U.S. Cl. 428—40 9 Claims

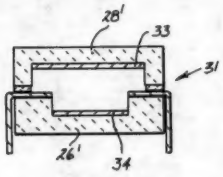
1. A pad comprising
multiple sheets of material;
means adjacent one end of each sheet for releasably securing said sheets one to the other to form said pad including repositionable adhesive applied on one side of each sheet adjacent said one end thereof; and
a receptive coating applied on the opposite side of each sheet adjacent the opposite end thereof such that, upon removal of the individual sheets from the pad, each sheet may be flexed to locate its opposite ends in overlying relation with one another and with said adhesive and said receptive coating in contact one with the other thereby adhesively securing said opposite ends together.

4,882,212

ELECTRONIC PACKAGING OF COMPONENTS INCORPORATING A CERAMIC-GLASS-METAL COMPOSITE

Narendra N. SinghDeo, New Haven; Deepak Mahulikar, Meriden, both of Conn., and Sheldon H. Butt, Godfrey, Ill., assignors to Olin Corporation, New Haven, Conn.

Filed Oct. 30, 1986, Ser. No. 924,970
Int. Cl.[4] B32B *1/04*; H01L *23/28*
U.S. Cl. 428—76 29 Claims



1. A semiconductor casing, comprising:
a base component and a lid component both formed from a ceramic-glass-metal composite material, said composite material having a structure comprising substantially a matrix of said glass with said ceramic and metal particles dispersed therein, said composite material further having a composition of;
up to about 25 volume % ductile metallic particles for enhancing the flow characteristics of said composite;

15 volume % to about 50 volume % glass for adhering said composite together;

the balance ceramic particles having a particle diameter greater than about 1 micron; and

said metal and ceramic particles selected so that each has a melting temperature greater than the melting temperature of said glass particles;

a metallic leadframe, said leadframe being embedded into said first component; and

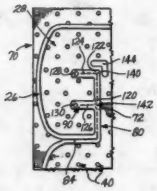
a sealing glass bonding said second component to said lid component.

4,882,213

ABSORBENT ARTICLE WITH TEAR LINE GUIDE

Paul G. Gaddis, Renton, and Lee E. Perdelwitz, Jr., Tacoma, both of Wash., assignors to Weyerhaeuser Company, Tacoma, Wash.

Filed Apr. 29, 1988, Ser. No. 187,855
Int. Cl.[4] B32B 9/00
U.S. Cl. 428—136 20 Claims



1. An absorbent article comprising:

a body comprised of fiber material;

the body having a densified first region of fiber material of a first density and a second region of fiber material contained in the first region and being of a second density lower than the first density;

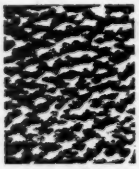
a weakened area positioned within the densified first region to define at least one line in such first densified region, the line terminating in the second region, whereby the line comprises a tear line along which the article may be torn.

4,882,214

MATTED GLASS

André Hecq, Nalinnes, Belgium, assignor to Glaverbel, Brussels, Belgium

Filed Apr. 6, 1987, Ser. No. 35,266
Claims priority, application United Kingdom, Apr. 8, 1986, 8606496
Int. Cl.[4] C03C 15/02; H01J 29/24
U.S. Cl. 428—141 14 Claims



1. A piece of light transmitting glass, comprising:

a flat sheet of glass having at least one surface area which is matted by surface pits and which has a population of merging or contiguous surface pits, the pits being of such a small area and and having bottom portions having a rounded profile so that clearly legible typed characters of 10-pitch size are still clearly legible when viewed through such matted surface area when that surface is held at a distance of 10 cm from the said characters.

4,882,215

PRECOATED METAL PLATE FOR HEAVY FORMING USE

Akira Ushio, Hirakata, and Tomotsu Sobata, Sakai, both of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Filed Apr. 4, 1988, Ser. No. 177,346
Claims priority, application Japan, Apr. 3, 1987, 62-082646
Int. Cl.[4] C23C 22/24
U.S. Cl. 428—143 5 Claims

1. A precoated metal plate for heavy forming use comprising a metal plate having on its surface a coating which has excellent adhesion to the metal plate under bending and processing conditions and which also has excellent scratch and corrosion resistant properties, said precoated metal plate prepared by applying to the surface of said metal plate an aqueous coating composition consisting essentially of a binder component (A) composed of an aqueous resin (A_1) and a water-soluble chromium compound (A_2) containing 30 to 90% by weight of hexavalent chromium and hard inorganic microparticles (B) having a Mohs' hardness of 3 to 9 and an average grain diameter of 0.1 to 20μ in a dry-film thickness of 0.05 to 5μ and which is characterized by having a percentage of horizontal sectional area of the inorganic microparticles protruded beyond the film surface of said binder component (A) at the film surface of 5% or more.

4,882,216

EPOXY RESIN FILM COVERED WITH METAL FOIL AND FLEXIBLE PRINTED WIRING BOARD

Hideo Takimoto; Katsuji Tokuda, and Koji Yamamoto, all of Kashima, Japan, assignors to Kashima Industries Co., Ibaraki, Japan

Filed Aug. 9, 1988, Ser. No. 230,310
Claims priority, application Japan, Aug. 10, 1987, 62-198271; Oct. 29, 1987, 62-271940
Int. Cl.[4] B32B 9/00
U.S. Cl. 428—209 2 Claims

1. A film comprising an electrically conductive metal foil and a flexible epoxy resin layer covered therewith, characterized in that the flexible epoxy resin layer is formed from a flexible epoxy resin composition containing 100 parts by weight of epoxy resins, 10 to 150 parts by weight of an ester of a mercaptocarboxylic acid with a polyhydric alcohol, and 0.01 to 20 parts by weight of amine.

4,882,217

NEEDLED PRESS FELT

Keith FitzPatrick, Dieren, Netherlands, assignor to Albany International Corp., Menands, N.Y.

Filed Nov. 9, 1988, Ser. No. 269,248
Int. Cl.[4] B32B 7/02
U.S. Cl. 428—212 6 Claims

1. A needled press felt for use in the press section of a papermaking machine, which comprises;

at least a first and a second kind of fiber in the batt part of the felt,

said first kind of fiber constituting at least part of the surface layer, which in position of use of said press felt, facing the paper web, is of considerably finer dimension than the other kinds of fiber and having a diameter of 0.010 mm or less and have low resistance to being essentially removed during the service of the felt of the papermaking machine,

said other kinds of fiber are essentially resistant during the removal of the first kind of fibers.

4,882,218

THERMAL TRANSFER RECORDING MEDIUM

Kunihiro Koshizuka, and Takao Abe, both of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Oct. 3, 1988, Ser. No. 252,879

Claims priority, application Japan, Oct. 13, 1987, 62-257885

Int. Cl.[4] B41M *5/26*

U.S. Cl. 428—216 23 Claims

1. A thermal transfer recording medium comprising a support having thereon a first heat softening layer and a second heat softening layer in this order, wherein said first and second heat softening layers contain a polyethylene glycol derivative having an ester linkage or an ether linkage, and at least one of said layers contains a colorant.

4,882,219

CRACK RESISTANT COATING FOR MASONRY STRUCTURES

John D. Harvey, Versailles, and Andre V. Gindre, Gif S/Yvette, both of France, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 944,082, Dec. 22, 1986, Pat. No. 4,804,693, which is a continuation-in-part of Ser. No. 771,746, Sep. 3, 1985, Pat. No. 4,634,724, which is a division of Ser. No. 645,989, Aug. 31, 1984, Pat. No. 4,562,109. This application Dec. 12, 1988, Ser. No. 282,725

The portion of the term of this patent subsequent to Dec. 31, 2002, has been disclaimed.

Int. Cl.[4] C08K *7/20, 7/28;* B32B *3/26, 5/16*

U.S. Cl. 428—220 8 Claims

1. A crack resistant coating for masonry structures subject to cracking comprising:

(1) a crack absorbing layer which is contiguous to the masonry structure which contains beads which are essentially spherical, which have an average diameter within the range of 0.5 mm to about 6 mm, and which are bound by a resin binder, and

(2) a conventional coating layer which is contiguous to and covers the crack absorbing layer wherein the resin binder exhibits sufficient flexibility to allow a degree of rolling action between the beads, thereby absorbing cracks forming in the masonry structure and preventing the transmission of the cracks to the conventional coating layer.

4,882,220

FIBROUS STRUCTURES HAVING A DURABLE FRAGRANCE

Akira Ono, Tokyo; Toshikazu Fuse, Nagahama; Osamu Miyamoto, Tottori; Shoso Makino, Hikone; Yoshihisa Yamato, Shiki; Hiroshi Kametani, Kurayoshi; Susumu Tokura, Osaka; Hiromi Tanaka, Hikone; Toru Ito; Hitomi Nakao, both of Nagahama; Shuji Tokuoka, Takatsuki, and Toshihide Takeda, Hikone, all of Japan, assignors to Kanebo, Ltd., Tokyo, Japan

Filed Jan. 26, 1989, Ser. No. 302,435

Claims priority, application Japan, Feb. 2, 1988, 63-23444; Apr. 11, 1988, 63-88669; Apr. 27, 1988, 63-105766; May 12, 1988, 63-115617; May 18, 1988, 63-121140; May 19, 1988, 63-122299; Jun. 15, 1988, 63-145687

Int. Cl.[4] B32B *5/16*

U.S. Cl. 428—240 11 Claims

1. A fragrant fibrous structure which has microcapsules encapsulating a perfume adhered thereto by a resinous binder, the weight ratio of said microcapsules to said resinous binder being between 2:1 and 1:5, and the sum of the amounts of said microcapsules and resinous binder being between 0.3 and 7.0%, based on the weight of the portion of the fibrous structure to which said microcapsules and resinous binder are adhered.

4,882,221

CHEMICALLY TREATED PAPER PRODUCTS - TOWEL AND TISSUE

Larry Bogart, Penn Valley; James J. Hipkins, Prospect Park, both of Pa., and Morris L. Smith, Lawnside, N.J., assignors to Scott Paper Company, Philadelphia, Pa.

Filed Aug. 6, 1987, Ser. No. 82,203

Int. Cl.[4] D21H *3/08, 3/12, 3/20;* A61K *7/48*

U.S. Cl. 428—308.8 4 Claims

1. A web of cellulosic fibers treated with an emollient composition consisting essentially of a water-soluble emollient, said emollient comprising glucose glutamate in an amount from 0.1 to 2% by weight of the web.

4,882,222

CARPET FIBER BLENDS

Arthur Talley, Jr., Eva, Ala., and Arnold E. Wilkie, Satellite Beach, Fla., assignors to Monsanto Company, St. Louis, Mo.

Filed Mar. 31, 1988, Ser. No. 175,790

Int. Cl.[4] D02G *3/00*

U.S. Cl. 428—362 17 Claims

1. A blend of fibers comprising carpet fibers and high shrinkage fibers, the carpet fibers being crimped fibers having deniers of at least 10 (dpf) and shrinkages of less than 12%, the high shrinkage fibers being fibers having shrinkages of at least 12%, the quantities and shrinkages of said carpet fibers and said high shrinkage fibers being such that when a saxony test carpet having a pile made from heatset yarn which prior to being heatset consists of said blend of fibers is subject to 40,000 traffics, the appearance thereof is better with respect to tuft endpoint definition and lack of matting, as determined by Test A, than corresponding test carpet having a pile made from heatset yarn which prior to being heatset consists entirely of said carpet fibers.

4,882,223

HOLLOW FIBERS PRODUCTION METHOD THEREOF AND THEIR APPLICATIONS PARTICULARLY IN THE FIELD OF MEMBRANE-TYPE SEPARATIONS

Philippe Aptel, and Jean-Michel Espenan, both of Toulouse, France, assignors to Institut National de Recherche Chimique Appliquee (IRCHA) and Centre National de la Recherche Scientifique, both of Paris, France

Continuation of Ser. No. 841,537, Jan. 30, 1986, abandoned. This application Oct. 30, 1987, Ser. No. 115,625

Claims priority, application France, Jun. 13, 1984, 84 09224; Jun. 13, 1984, 84 09225

Int. Cl.[4] D02G *3/00*

U.S. Cl. 428—398 8 Claims

1. Hollow fibers based on polymeric fibrogenic substances selected from the group consisting of vinylidene polyfluorides, polysulfones, polyacrylonitriles, cellulose and cellulosic esters, poly(vinyl chlorides), poly(vinyl acetates), polyamides, polyimides, polycarbonates, poly(phenylene oxides), polystyrenes,

polyethers, polyesters, poly(arylene oxides), polysulfides, polyvinylic polymers, polyallylic polymers, polyazoles, polyimidazoles, polyphosphazines, polyhydrazides and copolymers or mixtures thereof of a structure which is asymmetrical in that they present a relatively dense outer layer having a thickness smaller than 0.1 μm on their outer periphery, which is bonded to an open structure, the porosity of which increases in the direction of the inner face, said open structure underlying said outer layer being composed of a microporous layer directly in contact with said outer layer, the hollow fibers being characterized by the presence of pores of dimensions higher than 0.1 μm and lower than 2 μm, and a macroporous layer presenting macrovoids therein substantially cylindrical, radially oriented and regularly spaced, with homogeneous porosity walls in the radial direction opening on the side of the inner face of the fiber and not opening on the side of the outer face, such macrovoids having a main dimension higher than 2 μm, the proportion of such macrovoids representing at least 10% of the wall bulk.

4,882,224

MAGNETIC PARTICLES, METHOD FOR MAKING AND ELECTROMAGNETIC CLUTCH USING SAME

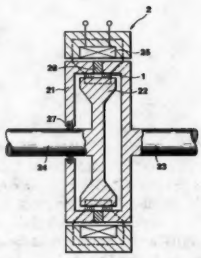
Hideharu Moro, and Yoshikazu Narumiya, both of Tokyo, Japan, assignors to TDK Corporation, Tokyo, Japan

Filed Apr. 28, 1988, Ser. No. 187,235

Claims priority, application Japan, Mar. 30, 1988, 63-77395

Int. Cl.[4] B32B *5/16*

U.S. Cl. 428—403 **9 Claims**



1. A magnetic particle, comprising:

a magnetic core having a diameter of about 30 to about 80 μm and

a shell covering the core formed from at least one member selected from the group consisting of titanium nitride, titanium carbide, aluminum nitride, aluminum oxide, zirconium oxide, silicon nitride, and silicon carbide, and having a thickness of about 2 to about 7 μm sufficient to render the particle durable.

4,882,225

MODIFIED POWDER OR PARTICULATE MATERIAL

Hiroshi Fukui; Ryujiro Namba; Tsutomu Saito; Yutaka Ohtsu; Asa Kimura; Motokiyo Nakano; Okitsugu Nakata; Kenichi Tommita; Kazuo Tokubo; Kazuhisa Ohno; Toshio Yoneyama; Takashi Ogawa; Hideo Morohoshi; Junichi Koyama; Taketoshi Kanda; Kunihiro Kawaguchi, and Yuzo Shimizu, all of Yokohama, Japan, assignors to Shiseido Company Ltd., Tokyo, Japan

Division of Ser. No. 875,140, Jun. 17, 1986, Pat. No. 4,801,445.

This application Apr. 26, 1988, Ser. No. 186,428

Claims priority, application Japan, Jul. 29, 1985, 60-165974; Jul. 29, 1985, 60-165974; Sep. 3, 1985, 60-194654; Sep. 3, 1985, 60-194654; Nov. 15, 1985, 60-256166; Nov. 15, 1985, 60-256166; Nov. 26, 1985, 60-265715; Nov. 26, 1985, 60-265715; Feb. 5, 1986, 61-23518; Feb. 5, 1986, 61-23518; Feb. 18, 1986, 61-33595; Feb. 18, 1986, 61-33595; Mar. 25, 1986, 61-66635; Mar. 25, 1986, 61-66635; Apr. 3, 1986, 61-77302; Apr. 3, 1986, 61-77301; Apr. 3, 1986, 61-77302; Apr. 3, 1986, 61-77301; Apr. 5, 1986, 61-78740; Apr. 5, 1986, 61-78741; Apr. 5, 1986, 61-78740; Apr. 5, 1986, 61-78741; May 9, 1986, 61-106175; May 23, 1986, 61-118901; May 28, 1986, 61-122821; May 31, 1986, 61-127047; Jun. 10, 1986, 61-134540; Jun. 13, 1986, 61-137839; Jun. 13, 1986, 61-137840; Jun. 13, 1986, 61-137841; Jun. 13, 1986, 61-137838

Int. Cl.[4] B05D *7/26;* B32B *5/16, 5/18;* C08J *9/06*

U.S. Cl. 428—405 **20 Claims**

1. A modified powder having a silicone polymer film coated on substantially the entire surface thereof, said powder being produced by bringing at least one silicone compound, in the form of vapor, having the general formula (I):

$$(R^1HSiO)_a(R^2R^3SiO)_b(R^4R^5R^6SiO_{\frac{1}{2}})_c \quad (I)$$

wherein R^1, R^2, and R^3 represent, independently, hydrogen, a hydrocarbon residue having 1 to 10 carbon atoms or a hydrocarbon residue having 1 to 10 carbon atoms and substituted with at least one halogen atom, provided that R^1, R^2, R^3 are not hydrogen at the same time, R^4, R^5, and R^6 represent, independently, hydrogen, a hydrocarbon residue having 1 to 10 carbon atoms or a hydrocarbon residue having 1 to 10 carbon atoms and substituted with at least one halogen atom, a is an integer of 1 or more, b is zero or an integer of 1 or more, and c is zero or 2, provided that a+b is an integer of 3 or more when c is zero, into contact with a powder having on the surface thereof an active site capable of catalytically polymerizing a silicone compound having a hydrosilyl group (Si—H), whereby the silicone compound is polymerized on substantially the entire surface of the powder.

4,882,226

CARRIER MATERIAL FOR USE IN CHROMATOGRAPHY OR CARRYING OUT ENZYMATIC REACTIONS

Jan A. J. Schutyser, Dieren, and Antonius J. W. Buser, Wehl, both of Netherlands, assignors to Akzo N.V., Arnhem, Netherlands

Filed Sep. 9, 1987, Ser. No. 94,742

Claims priority, application Netherlands, Sep. 23, 1986, 8602395

Int. Cl.[4] C12N *11/08;* G01N *33/545;* C08F *110/00;* B32B *5/16*

U.S. Cl. 428—407 **10 Claims**

1. A carrier material usable as such in chromatographic separations or as a starting material which, upon linkage to it of compounds containing ionic groups, ligands or bio-active materials can be used as an ion exchanger, as a clinical selective adsorbent, as a medium in affinity chromatography or in enzymatic reactions and comprises granules of a core material obtained by addition polymerization of monomers of which at least 50 mole % comprise (meth)acrylic acid or an ester forming equivalent thereof other than an ester of glycidol and a hydrophilic coating material, which is covalently bonded to the core by complete or partial conversion of the carboxyl

function with a compound containing at least three carbon atoms and epoxy group into an ester, characterized in that the compound containing at least three carbon atoms and an epoxy group is glycidol or glycidol etherified with a polyhydroxy compound having a molecular weight not higher than 1000 and that esters in which epoxy groups are still present are further reacted by etherification and/or hydrolysis to form a compound containing a hydroxyl group or an oligomer therof having a molecular weight not higher than 1000.

4,882,227

CONDUCTIVE RESIN COMPOSITION AND MOLDED PRODUCT USING THE SAME

Hidehiro Iwase, Tokyo, and Keiichi Habata, Kawaguchi, both of Japan, assignors to Toshiba Chemical Corporation, Tokyo, Japan

Filed Mar. 9, 1988, Ser. No. 165,905

Claims priority, application Japan, Mar. 9, 1987, 62-51998; Mar. 9, 1987, 62-51999; Mar. 16, 1987, 62-58880; Mar. 25, 1987, 62-68779; Mar. 27, 1987, 62-71568; Mar. 27, 1987, 62-71570; Apr. 7, 1987, 62-83917

Int. Cl.[4] H05K *9/00*; C08K *3/08*

U.S. Cl. 428—407 **30 Claims**

1. A pelletized conductive resin composition comprising a thermoplastic resin layer formed on the surface of a conductive filler comprising conductive fibers and a low-melting point metal having a melting point higher than that of the thermoplastic resin and lower than the molding temperature of the conductive resin composition, and an effective amount of a phosphorus-based antioxidant to improve the wettability of the conductive fibers.

27. An electromagnetic wave shielding molded product prepared by molding the conductive resin composition of claim 1 at a temperature higher than the melting point of the low-melting point metal.

4,882,228

MULTILAYER COATED FILM STRUCTURES

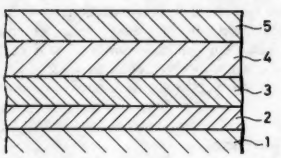
Tadamitsu Nakahama, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Apr. 22, 1988, Ser. No. 184,880

Claims priority, application Japan, Apr. 23, 1987, 62-100281

Int. Cl.[4] B32B *15/08*

U.S. Cl. 428—421 **8 Claims**



1. A multilayer coated film structure comprising,

an undercoat layer provided on a predetermined surface,

a sprayed resin intermediate coat layer put on said undercoat layer,

a final coat layer of one of melamine alkyd resin coating and melamine acrylic resin coating including an antioxidant within the range of 1.0 to 5.0% by weight and put on said intermediate coat layer, and

a transparent glass-like or hyaline coating layer of fluorocarbon resin put on said final coat layer.

4,882,229

BLENDS OF HIGH MOLECULAR WEIGHT POLYBUTYLENE WITH LOW DENSITY POLYETHYLENE

Charles C. Hwo, Sugarland, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Apr. 29, 1988, Ser. No. 187,753

Int. Cl.[4] B32B *15/08*

U.S. Cl. 428—461 **21 Claims**

1. A composition which is capable of forming peel seals, comprising:

from about 8 percent by weight to about 49 percent by weight of the butene-1 homopolymer or copolymer having an average molecular weight of at least 500,000; and

from about 92 percent by weight to about 51 percent by weight of a modified or non-modified low density polyethylene having a density of less than 0.930 g/cc.

4,882,230

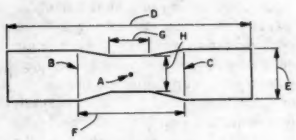
MULTILAYER POLYMERIC FILM HAVING DEAD BEND CHARACTERISTICS

Steven B. Warner, Acworth, Ga., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Filed Oct. 30, 1987, Ser. No. 115,132

Int. Cl.[4] B32B *27/08*

U.S. Cl. 428—516 **15 Claims**



1. A multilayer polymeric film having dead bend characteristics which are substantially planar isotropic which comprises a laminate of at least two layer of one or more polymeric films, in which:

A. each polymer film layer is highly oriented in one direction, such that each polymeric film layer has dead bend properties with respect to bending deformations substantially normal to the direction of orientations; and

B. the directions of orientation of each polymeric film layer forms an angle of least about 30 degrees with the direction of orientation of each adjacent polymeric film layer; in which each polymeric film layer is composed substantially of polymer fibrils having an average length of at least about 5 micrometers and an average diameter of less than about 0.5 micrometers.

4,882,231

MAGNETO-OPTICAL RECORDING MEDIUM

Katsuhisa Aratani, Chiba, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Nov. 30, 1988, Ser. No. 278,022

Claims priority, application Japan, Dec. 4, 1987, 62-307070

Int. Cl.[4] G11B *5/66, 7/24*

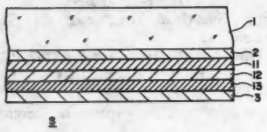
U.S. Cl. 428—611 **4 Claims**

1. A magneto-optical recording medium comprising a substrate, a first magnetic film, a second magnetic film and a third magnetic film sequentially formed on said substrate,

said first magnetic film having a larger rotation angle of a plane of polarization than said third magnetic film,

respective Curie temperature Tc1, Tc2, Tc3 of said first, second, and third magnetic films satisfying the relationhship with respect to room temperature T_{RT}, $Tc2 > T_{RT}$, and $Tc2 < Tc1$, $Tc2 < Tc3$, and

said second magnetic film magnetically coupling said first and third magnetic films and interrupting said magnetic



coupling between said first and third magnetic films at a recording temperature higher than Tc2.

4,882,232

POROUS METAL STRUCTURE AND METHOD OF MANUFACTURING OF SAID STRUCTURE

Bernard Bugnet, Champs sur Marne, and Denis Doniat, Le Perreux, both of France, assignors to Sorapec Societe de Researche et d'Applications Electrtochimiques, Fontenay sous Bois, France

Continuation of Ser. No. 78,055, Jul. 27, 1987, abandoned, which is a continuation of Ser. No. 693,040, Jan. 22, 1985, abandoned. This application Jun. 8, 1988, Ser. No. 204,118

Claims priority, application France, Jan. 25, 1984, 84 01110

Int. Cl.[4] C25D *5/56;* C23C *14/34*

U.S. Cl. 428—613 **5 Claims**

1. A method of fabrication of a metallized porous structure from an organic porous support having a three-dimensional lattice network with an open pore volume higher than 80% which defines a plurality of pores substantially in communication with each other, which comprises the step of premetallizing said support under vacuo by cathode sputtering with a metal or alloy which is a member selected from the group consisting of platinum, platinum-base alloys, nickel, chromium, iron, copper, gold, silver, tin, aluminum, titanium, zinc, brass, bronze, a ferrochromium alloy and a mixture thereof, thereby depositing on said support a continuous layer of 0.05 micron to 1 micron of said metal or alloy and then applying at least one metal layer of copper or nickel by a chemical or electrochemical process.

5. An electrode support for a nickel, cadmium, iron or lead electrode made of the metallized porous structure produced by the method of claim 1.

4,882,233

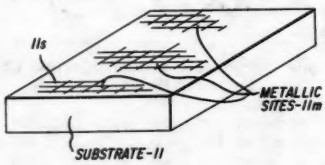
SELECTIVELY DEPOSITED ELECTRODES ONTO A SUBSTRATE

K. R. Ramaprasad, Princeton, N.J., assignor to Chronar Corp., Lawrenceville, N.J.

Continuation of Ser. No. 615,248, May 30, 1984, abandoned. This application Feb. 19, 1988, Ser. No. 157,843

Int. Cl.[4] B23C *3/02*

U.S. Cl. 428—620 **8 Claims**



1. A conductive substrate for the deposition of material thereon, which comprises an insulating layer upon said substrate; and a plurality of apertures in said insulating layer containing conductive material formed from said substrate forming a plurality of metallic nucleating centers for the adherence of said material to said substrate.

4,882,234

STORAGE-STABLE PORPHIN COMPOSITIONS AND A METHOD FOR THEIR MANUFACTURE

Jan-Ji Lai, Sunnyvale; Kevin M. Smith, Davis, and Bruce W. McCaul, Palo Alto, all of Calif., assignors to Healux, Inc., Sunnyvale, Calif.

Filed Nov. 12, 1986, Ser. No. 930,160

Int. Cl.[4] A61K *31/40;* C07D *437/22*

U.S. Cl. 514—185 **12 Claims**

1. A process for preparing a storage-stable carboxyhydroxyporphin-based product, said carboxyhydroxyporphin having from one to three inclusive carboxys and from one to three inclusive hydroxys per porphin ring, which process comprises the step of heat-treating a pH 5 to pH 9 buffered aqueous solution of said carboxyhydroxyporphin at a temperature of from 60° C. to 120° C. for a time in the range of from about 5 to about 100 hours sufficient to form a product in which at least about 80% of the carboxyhydroxyporphin is a storage-stable porphinbased oligomer.

7. The storage-stable carboxyhydroxyporphin oligomer product which is formed by the process of claim 1.

11. A storage-stable carboxyhydroxyporphin-based pharmaceutical preparation comprising the product of claim 7 in a pharmaceutically acceptable injectable liquid carrier.

4,882,235

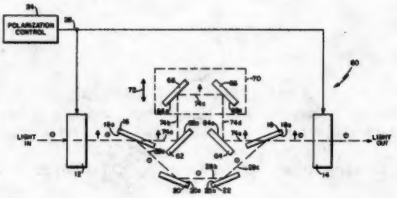
LIQUID CRYSTAL CELL WINDOW

Daniel P. Resler, Wilmington, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Mar. 2, 1988, Ser. No. 162,922

Int. Cl.[4] G02F *1/13;* B32B *15/04*

U.S. Cl. 428—642 **3 Claims**



1. An optically transparent electrode comprising

a sheet of optically-transparent, semi-insulating crystalline material, said sheet having a region on a surface of said sheet implanted with ions, said ion-implanted region comprising less than the entire area of said surface of said sheet, said sheet having been annealed following ion implantation to electrically activate said implanted ions, wherein said sheet exhibits uniform transmission characteristics over said surface to radiant energy of a predetermined wavelength.

4,882,236

RIGID MAGNETIC RECORDING DISKS AND METHOD OF PRODUCING SAME

Charles W. Smith; Sheldon H. Butt, both of Godfrey, Ill., and Eugene Shapiro, Hamden, Conn., assignors to Olin Corporation, Cheshire, Conn.

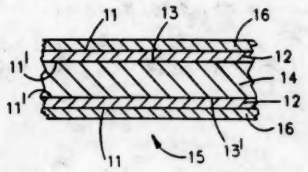
Filed Feb. 10, 1988, Ser. No. 154,557

Int. Cl.[4] B32B *15/20*

U.S. Cl. 428—652 **6 Claims**

1. A substrate for a rigid magnetic recording disk, said substrate comprising:

a clad material having at least first and second layers, each of said layers having first and second opposing surfaces;
said first layer comprising a copper-based alloy containing nickel;
said second layer comprising a material selected from the group consisting of aluminum and aluminum alloys;
said first surface of said first layer being substantially asperity free;



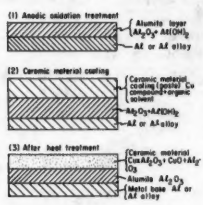
said second surface of said first layer being metallurgically bonded to at least one of said surfaces of said second layer without any substantial intermetallic formation;
the thickness of said first layer being from about 0.2% to about 20% of the thickness of said second layer;
the hardness and the mechanical strength of said first layer being substantially greater than said second layer; and
said second layer being substantially less dense than said first layer.

4,882,237

ALUMINUM-CERAMIC COMPLEX MATERIAL

Mamoru Koyama, Fujiitera, Japan, assignor to Tokyo Metal Co., Ltd., Japan

Filed Mar. 14, 1988, Ser. No. 167,571
Claims priority, application Japan, Mar. 18, 1987, 62-65489
Int. Cl.[4] B32B *15/04, 15/20;* C04B *35/10*
U.S. Cl. 428—699 **11 Claims**



1. A layered aluminum-ceramic complex material comprising
a substrate layer containing aluminum,
an anodically induced aluminum oxidation layer covering said substrate layer,, and
a unified copper ceramic surface layer integrally bonded to and covering said aluminum oxidation layer,
said copper ceramic surface layer being formed by contacting said aluminum oxidation layer with an applied transition layer containing copper at a temperature sufficient to convert said applied transition layer to said ceramic surface layer.

4,882,238

DIE FOR USE IN FORMING LENS

Takashi Yoshioka, and Akira Doi, both of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 70,122, Jan. 6, 1987, abandoned, which is a continuation of Ser. No. 821,913, Jun. 23, 1986, abandoned. This application Oct. 3, 1988, Ser. No. 251,945
Claims priority, application Japan, Jan. 28, 1985, 60-14066
Int. Cl.[4] B32B *9/00*
U.S. Cl. 428—698 **1 Claim**

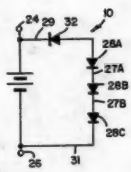
1. A die having superior wear and corrosion resistance, a surface roughness R_{max} of 1000 Å or less, and which is a structure for forming optical lenses, wherein said die is coated at a temperature of 800° C. or lower with a single or multilayer amorphous film of silicon nitride, silicon carbide or a combination thereof, having a thickness of 5 μm or less, by a plasma-CVD coating method.

4,882,239

LIGHT-RECHARGEABLE BATTERY

Derrick P. Grimmer, St. Paul, and Robert P. Wenz, Cottage Grove, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 8, 1988, Ser. No. 165,488
Int. Cl.[4] H01M *14/00*
U.S. Cl. 429—7 **9 Claims**



1. A light-rechargeable battery, including:
a tubular rechargeable cell;
a pair of terminals extending from the cell;
two or more solar cell units interconnected in a series circuit between the terminals, each solar cell unit substantially extending around a circumference of the rechargeable cell; and
fastener means for fastening the solar cell units to the rechargeable cell.

4,882,240

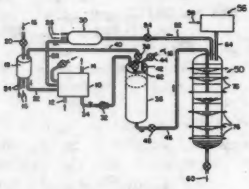
CLOSED CYCLE ELECTRICAL POWER SYSTEM

William G. Harris, Seattle, and Douglas J. Silva, Kent, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Division of Ser. No. 50,447, May 18, 1987, which is a division of Ser. No. 761,995, Aug. 2, 1985. This application Jan. 11, 1988, Ser. No. 142,099
Int. Cl.[4] H01M *8/18;* C01B *3/02*
U.S. Cl. 429—17 **20 Claims**

1. A closed cycle electrical power system comprising:
(a) a hydrogen-halogen fuel cell in which hydrogen gas and halogen are converted catalytically to a haloacid with the generation of electrical energy;
(b) an accumulator for the haloacid leaving the fuel cell;
(c) a generator for generating hydrogen for recycling to the fuel cell from the holoacid by reacting the haloacid on

demand with a suitable metal in a controlled environment; and



(d) means for feeding the metal to the generator without introducing contaminants to the controlled environment.

4,882,241

REDOX BATTERY

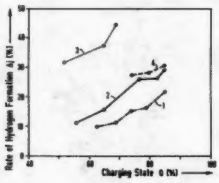
Angelika Heinzel, Freiburg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Oct. 19, 1988, Ser. No. 259,924

Claims priority, application Fed. Rep. of Germany, Oct. 23, 1987, 3735992

Int. Cl.[4] H01M *8/20*

U.S. Cl. 429—19 **11 Claims**



1. A battery comprising:

at least one "redox" cell, each cell having first and second chambers separated by a membrane;

a positive electrode disposed in the first chamber;

a negative electrode disposed in the second chamber;

a catholyte fluid in said first chamber, said positive electrode being inert to the catholyte fluid; and

an anolyte fluid in said second chamber, said negative electrode being inert to the anolyte fluid;

said negative electrode containing a combination of gold (Au), thallium (Tl), lead (Pb), and bismuth (Bi) as a catalyst for the acceleration of Cr^{3+}/Cr^{2+} "redox" processes.

4,882,242

CLOSED GASTIGHT BATTERY, IN PARTICULAR NICKEL-CADMIUM

Manfred Kilb, Frankfurt am Main, and Klaus D. Degen, Bad Homburg, both of Fed. Rep. of Germany, assignors to Christoph Emmerich GmbH & Co. KG, Frankfurt am Main, Fed. Rep. of Germany

Filed Aug. 8, 1988, Ser. No. 229,322

Claims priority, application Fed. Rep. of Germany, Sep. 2, 1987, 8711863[U]; Jul. 16, 1988, 3824222

Int. Cl.[4] H01M *6/42*

U.S. Cl. 429—154 **18 Claims**

1. In a closed, gas-tight stacked, multiple-cell electric battery construction, in combination:

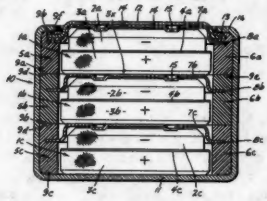
(a) a cell comprising a pair (*2a, 3a*) of cooperable negative and positive slab-like cell elements disposed in stacked relation, presenting one negative outward face and one opposite positive outward face,

(b) a circumferential electrically-insulating double-ended sealing housing (*6a*) surrounding both of said stacked cell elements (*2a, 3a*) and comprising a uniform-thickness annular wall having axially-aligned equal-area compression end faces,

(c) said housing having one end adapted to be closed, and having its other end open,

(d) an outwardly dished electrically conductive wall (*7a*) electrically connected to one outward face of said stacked cell elements (*2a, 3a*), said conductive wall having its peripheral edge portions axially inwardly offset and sealed in gas-tight and liquid-tight fashion to said one end of said housing,

(e) said other open housing end being substantially coplanar with the other outward face of said stacked cell elements, and



(f) substantially coplanar means (*7b, 6b*) directly engaging said coplanar other open housing end and said other element outward face, effecting a seal of said other open housing end, said substantially coplanar means comprising one end of a second double-ended sealing housing and a second outwardly dished conductive wall having an inwardly axially-offset periphery molded into and sealed to said second sealing housing and constituting an additional cell which has assembled negative and positive slab-like cell elements disposed in said housing,

(g) the other end of said second housing and the outer face of the assembled cell elements contained therein being substantially coplanar to facilitate their being sealed.

4,882,243

PREPARATION OF METALLIC CATION CONDUCTING POLYMERS BASED ON STERICALLY HINDERED PHENOLS CONTAINING POLYMERIC SYSTEMS

Terje A. Skotheim, Shoreham, N.Y.; Yoshiyuki Okamoto, Fort Lee, N.J., and Hung S. Lee, Woodside, N.Y., assignors to Polytechnic University, Brooklyn, N.Y. and Associated Universities, Inc., Washington, D.C.

Filed Nov. 22, 1988, Ser. No. 275,013

Int. Cl.[4] H01M *10/40*

U.S. Cl. 429—192 **22 Claims**

1. A solvent-free polymer electrolyte containing a sterically hindered phenol metal ion salt.

4,882,244

BATTERY CONTAINING A METAL ANODE AND AN ELECTROLYTE PROVIDING HIGH RATES OF METAL ELECTROLYSIS AT NEAR AMBIENT TEMPERATURES

Francis M. Donahue; Leif R. Simonsen, and Russell L. Moy, all of Ann Arbor, Mich., assignors to The University of Michigan-Ann Arbor, Ann Arbor, Mich.

Filed Apr. 2, 1987, Ser. No. 33,208

Int. Cl.[4] H01M *6/14, 6/16*

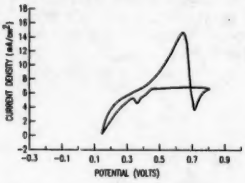
U.S. Cl. 429—194 **16 Claims**

1. A battery comprising an anode, a cathode, and an electrolyte, wherein:

the anode comprises aluminum, zinc, magnesium, calcium, sodium, potassium, gallium, antimony, lead, or an alloy thereof;

the electrolyte comprises an acidic mixture of a cation component, a Lewis acid and a nitrile component; wherein

(1) the cation component is LiCl, NaCl, KCl or an organic cation which is a 1,3-dialkylimidazolium cation, a halide derivative of a 1,3-dialkylimidazolium cation, a N-alkyl pyridinium cation, an alkyl derivative of a N-alkyl



pyridinium cation, a tetraalkyl ammonium cation, a halide derivative of a tetraalkyl ammonium cation, or a mixture thereof; and

(2) the nitrile component is an aliphatic or unsaturated organic compound containing from 1 to 6 carbon atoms and being substituted by at least one —CN substituent.

4,882,245

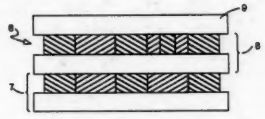
PHOTORESIST COMPOSITION AND PRINTED CIRCUIT BOARDS AND PACKAGES MADE THEREWITH

Jeffrey D. Gelorme, Binghamton, N.Y.; Robert J. Cox, Watsonville, and Sergio A. R. Gutierrez, San Jose, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 791,886, Oct. 26, 1985, abandoned. This application Jun. 12, 1987, Ser. No. 62,360

Int. Cl.⁴ G03C *1/72*; A01B *9/00*; H02B *1/00*

U.S. Cl. 430—14 **16 Claims**



1. A printed circuit board comprising a fully cured epoxy-resin-containing substrate, a pattern of conductive material disposed on said substrate, and an imagewise pattern of a fully cured photocurable composition disposed on said substrate;

said fully cured photocurable composition resulting from a reaction between a photocurable composition and a cationic photoinitiator;

said photocurable composition comprising the product of:

(a) a polyepoxyfunctional novolak resin which is curable through the action of said cationic photoinitiator; and

(b) a diluent soluble in developing solvents for photoresists and reactive with the epoxy functional groups of said epoxy novolak resin by the action of said cationic photoinitiator to form said fully cured composition insoluble in said developing solvents;

wherein said epoxy novolak resin comprises at least approximately 65 weight percent of the resin solids of said photocurable composition, said diluent comprises from approximately 10 to approximately 35 weight percent of said resin solids, and said cationic photoinitiator comprises from approximately 2 to approximately 6 weight percent of said resin solids;

said fully curved photocurable composition being at least approximately 0.0015 inch in cross sectional height; and

said fully cured photocurable composition being substantially resistant to delamination from said substrate when temperature cycled.

2. A package comprising at least 2 printed circuit boards according to claim 1; said circuit boards having been fully cured in layered contact.

4,882,246

METHOD FOR SUPPLEMENTING REPLENISHER FOR DEVELOPER IN AUTOMATIC DEVELOPING MACHINE FOR PRESENSITIZED PLATE

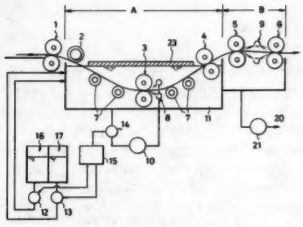
Hisao Ohba; Tomoaki Takekoshi, and Kenji Kunichika, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Ashigara, Japan

Filed Jul. 14, 1988, Ser. No. 218,892

Claims priority, application Japan, Jul. 17, 1987, 62-178457

Int. Cl.⁴ G03C *5/00*

U.S. Cl. 430—30 **14 Claims**



1. A method for supplementing a replenisher for developer which comprises developing a large number of presensitized plates for use in making lithographic printing plates, which have been imagewise exposed to light, with a developer comprising an aqueous solution of sodium silicate or potassium silicate in an automatic developing machine, comprising the steps of determining an AC impedance of the developer contained in the automatic developing machine, obtaining a correction impedance from the measured impedance value and rate of replacement and supplementing a desired amount of the replenisher to the developer when the correction impedance reaches a predetermined value, wherein the correction impedance is determined by substituting the measured impedance and a rate of replacement into a predetermined calculation equation as follows:

$$Y=X-(-ax_n+b-c)$$

$$x_n=(x_{n-1}\cdot A+B)/(A+B)$$

$$x_0=0$$

wherein x_n represents the rate of replacement; Y is the correction impedance value; X is the measured impedance value; a denotes the slope of the rate of replacement to the impedance value (b—c); b is an initial impedance value of the developer; c is the final impedance value thereof; A is the initial amount of the developer; B is the amount of the replenisher per supplementation; and n is the number of supplementation.

4,882,247

ELECTROPHOTOGRAPHIC IMAGE RECORDING METHOD

Kazuo Marugama; Kiyoshi Horie; Tsuneo Noami; Toshiro Yamamoto; Koji Adachi; Toru Okamoto; Takeshi Sumikawa, and Furuya Nobumasa, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Nov. 17, 1987, Ser. No. 121,807

Claims priority, application Japan, Nov. 18, 1986, 61-272790; Dec. 4, 1986, 61-287809; Jan. 23, 1987, 62-12234; Apr. 13, 1987, 62-88626; Apr. 13, 1987, 62-88628; Jun. 10, 1987, 62-143301

Int. Cl.[4] G03G *13/01*

U.S. Cl. 430—45 7 Claims

1. An image recording method comprising:

a first step of forming a first electrostatic latent image on a latent image carrier and developing the first electrostatic latent image with a first nonmagnetic toner charged to one polarity to form a first toner image;

a second step of forming a second electrostatic latent image on the latent image carrier carrying said first toner image and developing the second electrostatic latent image with double-element developer formed from mixing a second toner charged to a polarity opposite that of the first toner and a magnetic carrier having a density of 4.0 g/cm^3 or less to form a second toner image, whereby said first toner image is not disturbed by formation of said second image; and

a third step of transferring said first and second toner images to a transfer material.

4,882,248

ELECTROPHOTOGRAPHIC PLATE FOR MAKING PRINTING PLATE COMPRISING PHTHALOCYANINE PIGMENT AND THIOBARBITURIC ACID RESIDUE CONTAINING COMPOUND

Jun Yamada, and Hiromi Eguchi, both of Nagaokakyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

Filed Mar. 14, 1988, Ser. No. 167,954

Claims priority, application Japan, Mar. 16, 1987, 62-61483

Int. Cl.[4] G03G *13/26*

U.S. Cl. 430—49 13 Claims

1. An electrophotographic plate for making a printing plate therefrom which comprises an electrically conductive and hydrophilic base and a photoconductive layer provided thereon, said photoconductive layer containing an alkali and-/or alcohol soluble polymer, a phthalocyanine pigment and a compound represented by the formula (I):

$$(X)_nY \qquad (I)$$

wherein X represents thiobarbituric acid residue from which one hydrogen atom at the 5-position has been eliminated and in which a nitrogen atom in a ring may have a substituent; Y represents an n-valent substituted or unsubstituted alkylene or aralkylene residue; and n represents an integer of 2 to 4.

4,882,249

TETRAKISAZO PHOTOCONDUCTIVE COMPOSITION AND ELECTROPHOTOGRAPHIC PHOTORECEPTOR USING THE SAME

Katsugi Kitatani, and Satoshi Hoshi, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

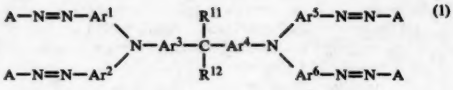
Filed Sep. 12, 1988, Ser. No. 243,358

Claims priority, application Japan, Sep. 11, 1987, 62-228029

Int. Cl.[4] G03G *5/06*; G09B *35/64*

U.S. Cl. 430—56 17 Claims

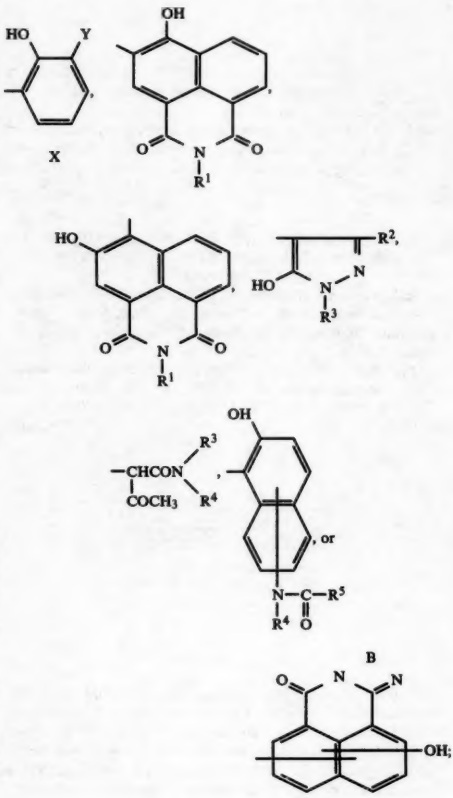
1. A photoconductive composition comprising at least one tetrakisazo represented by the following formula (1):



(I)

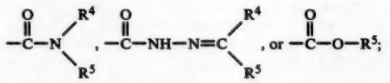
where R^{11} and R^{12} independently represent hydrogen atom or a substituted or unsubstituted alkyl, aryl or aralkyl group, and R^{11} and R^{12} may be the same or different or R^{11} and R^{12} may be taken together to form a ring; Ar^1, ar^2, Ar^3, Ar^4, Ar^5, and Ar^6 independently represent a substituted or unsubstituted arylene group;

A represents



X represents a group that forms an aromatic ring or a heterocyclic ring, which is substituted or unsubstituted, by condensation with the benzene ring in the aforesaid formula having a hydroxyl group and Y on the ring;

Y represents



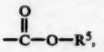
R^1 represents an alkyl group, a phenyl group or a substituted group thereof;

R^2 represents a hydrogen atom, a lower alkyl group, a car-

bamoyl group, a carboxyl group, an alkoxycarbonyl group, an aryloxycarbonyl group, or a substituted or unsubstituted amino group;

R^3 represents an alkyl group, an aromatic group, a hetero-aromatic group, or a substituted group thereof;

R^4 and R^5 independently represent a hydrogen atom, an alkyl group, an aromatic group, a hetero-aromatic group, or a substituted group thereof, provided that both R^4 and R^5 are not hydrogen atoms at the same time, and when Y represents



R^5 is not a hydrogen atom; and

B represents a divalent group that forms an aromatic hydrocarbon or a divalent group that forms a hetero ring which contains one or more nitrogen atoms in the ring, and the ring is unsubstituted or substituted.

4,882,250

COPPER PHTHALOCYANINE PHOTORECEPTOR AND METHOD FOR PRODUCING THE SAME

Jonq-Min Liu; Tai-Jun Chen, both of Hsinchu; Lii-Chyuan Tsai, Kaohsiung, and Li-Wen Pai, Changhwa, all of Taiwan, assignors to Industrial Technology Research Institute, Hsinchu, Taiwan

Filed Jul. 22, 1988, Ser. No. 222,774
Int. Cl.[4] G03G 5/14
U.S. Cl. 430—58 **2 Claims**

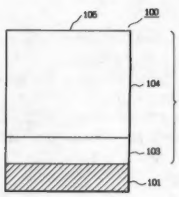
1. A photoreceptor have a substrate, a layer of charge generating material and a layer of charge transporting material, said charge generating layer being formed by applying a film forming composition comprising a binder and copper phthalocyanine, and then exposing said composition to iodine vapor at a temperature of 20–90 deg. C., said charge transporting material comprising a binder and a compound selected from hydrazones, pyrazolines, oxazoles, thiazoles and triaryl methane.

4,882,251

LIGHT RECEIVING MEMBER HAVING A MULTILAYERED LIGHT RECEIVING LAYER COMPOSED OF A LOWER LAYER MADE OF ALUMINUM-CONTAINING INORGANIC MATERIAL AND AN UPPER LAYER MADE OF NON-SINGLE-CRYSTAL SILICON MATERIAL

Tatsuyuki Aoike; Masafumi Sano; Takehito Yoshino; Toshimitsu Kariya, and Hiroaki Niino, all of Nagahama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 19, 1988, Ser. No. 183,701
Claims priority, application Japan, Apr. 22, 1987, 62-99547; Apr. 27, 1987, 62-104915; May 6, 1987, 62-111622; May 7, 1987, 62-112159; Jun. 29, 1987, 62-161538; Aug. 5, 1987, 62-196566; Aug. 6, 1987, 62-197829; Dec. 16, 1987, 62-316312
Int. Cl.[4] G03G 5/082, 5/14
U.S. Cl. 430—57 **30 Claims**



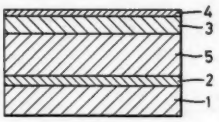
1. A light receiving member having an aluminum support and a multilayered light receiving layer exhibiting photoconductivity formed on said aluminum support, characterized in that said multilayered light receiving layer comprises: a lower layer (a) in contact with said support and an upper layer (b) having a free surface disposed on sid lower layer (a); said lower layer (a) being formed of an inorganic material composed of aluminum atoms, silicon atoms, hydrogen atoms and atoms of an element capable of contributing to the control of image quality selected from the group consisting of boron, gallium, indium, thallium, phosphorus, arsenic, antimony, bismuth, sulfur, selenium, tellurium and polonium; said lower layer (a) having a portion in which said aluminum, silicon and hydrogen atoms are unevenly distributed across the layer thickness; said aluminum atoms being contained in said lower layer (a) such that their content decreases across the layer thickness upward from the interface between said lower layer (a) and said aluminum support and wherein said content of said aluminum atoms is lower than 95 atomic % in the vicinity of the interface between said lower layer (a) and said aluminum support and higher than 5 atomic % in the vicinity of the interface between said lower layer (a) and said upper layer (b); said upper layer (b) comprising a plurality of layer regions, each said region comprising a non-single-crystal material composed of silicon atoms as the matrix, and wherein the layer region adjacent said lower layer (a) comprises (i) a non-single-crystal material containing silicon atoms as the matrix, (ii) at least one kind of atoms selected from the group consisting of hydrogen atoms and halogen atoms, and (iii) atoms of a conductivity controlling element selected from the group consisting of Group III atoms, Group V atoms, except nitrogen, and Group VI atoms, except oxygen, of the periodic table.

4,882,252

ELECTROPHOTOGRAPHIC SENSITIVE MEMBER WITH AMORPHOUS SILICON CARBIDE

Takao Kawamura, 17-11, 1-cho, Takakuradai, Sakai-shi, Osaka-fu; Naooki Miyamoto, Yohkaichi; Hiroshi Ito, Yohkaichi; Hitoshi Takemura, Yohkaichi; Kazumasa Ohkawa, Yohkaichi, and Kokichi Ishibitsu, Yohkaichi, all of Japan, assignors to Kyocera Corporation, Tokyo and Takao Kawamura, Sakai, both of, Japan

Filed May 23, 1988, Ser. No. 197,461
Int. Cl.[4] G03G 5/082, 5/14
U.S. Cl. 430—58 **15 Claims**



1. An electrophotographic sensitive member comprising: a substrate;

a carrier transport layer having a thickness of between about 1 and about 50 μm, said carrier transport layer being formed of an amorphous silicon carbide with an atomic ratio of carbon to silicon set at 1:100 to 1:9; and

a carrier generation layer formed of an amorphous silicon carbide with an atomic ratio of carbon to silicon set at 1:100 to 9:1,

wherein said carrier transport layer and said carrier generation layer comprises a dopant selected from the group consisting of elements of Group Va of the Periodic Table and elements of Group IIIa of the Periodic Table and mixtures thereof, said dopant being present in said carrier transport layer in an amount greater than in said carrier generation layer; and

wherein hydrogen or a mixture thereof with halogen is

incorporated at a ratio of about 5 to about 50 atomic percent for terminating dangling bonds.

4,882,253

ORGANIC LAMINATED PHOTOSENSITIVE MATERIAL OF POSITIVE CHARGING TYPE

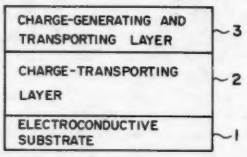
Yoshiaki Kato, Ikaruga; Masashi Tanaka, Izumi-Ohtsu; Mitsuji Tsujita, Osaka; Keizo Kimoto, Sakai; Hirotsugu Nishikawa, Osaka, and Mika Kawaguchi, Neyagawa, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Filed Jul. 28, 1988, Ser. No. 225,522

Claims priority, application Japan, Jul. 29, 1987, 62-187646

Int. Cl.[4] G03G 5/14

U.S. Cl. 430—59 10 Claims



1. An organic laminated photosensitive material comprising an electroconductive substrate, a charge-transporting layer formed on the substrate and a charge-generating and transporting layer formed on the charge-transporting layer, wherein the charge-transporting layer is composed of a binder resin containing a hole-transporting substance, and the charge-generating and transporting layer contains a charge-generating substance and a hole-transporting substance at a weight ratio of from 1/3.5 to 1/40 and has a charge-generating substance content of 10 to 1% by weight based on the sum of the hole-transporting substance and binder and a thickness of 5 to 30 μm.

3. A photosensitive material as set forth in claim 1, wherein the hole-transporting substance is 1,1-diphenyl-4,4-di-N-diethyl-p-anilyl-1,3-butadiene, N-ethylcarbazole-3-carbaldehydo-diphenylhydrazone, diethylaminobenzaldehydo-diphenylhydrazone or N,N,N',N'-tetraphenylbenzidine.

4,882,254

PHOTOCONDUCTIVE IMAGING MEMBERS WITH MIXTURES OF PHOTOGENERATOR PIGMENT COMPOSITIONS

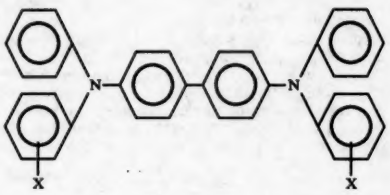
Rafik O. Loutfy, Willowdale; Ah-Mee Hor; George Liebermann, both of Mississauga; Alan J Toth, Burlington; Cheng-Kuo Hsiao, Mississauga, all of Canada; Kathleen M. Carmichael, Williamson, and Emery G. Tokoli, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jul. 5, 1988, Ser. No. 214,990

Int. Cl.[4] G03G 5/10

U.S. Cl. 430—59 36 Claims

1. A layered photoresponsive imaging member comprised of a supporting substrate; a photogenerator layer comprised of a mixture of first and second pigments, said mixture being selected from the group consisting of perylenes and phthalocyanines; polycyclic quinones and phthalocyanines; and perinones and phthalocyanines; and a hole transport layer comprising molecules of the following formula



dispersed in a resinous binder, and wherein X is selected from the group consisting of halogen and alkyl, wherein the imaging member exhibits photosensitivity in the wavelength range of from about 400 to about 900 nanometers.

4,882,255

AZO PHOTOCONDUCTOR FOR ELECTROPHOTOGRAPHY

Yoshimasa Hattori, and Noboru Furusho, both of Kawasaki, Japan, assignors to Fuji Electric Co., Ltd., Kawasaki, Japan

Filed Dec. 21, 1988, Ser. No. 287,081

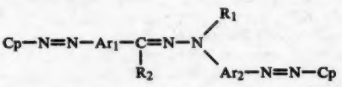
Claims priority, application Japan, Dec. 28, 1987, 62-332366

Int. Cl.[4] G03G 5/06

U.S. Cl. 430—73 4 Claims

1. A photoconductor for electrophotography comprising:

at least one disazo compound represented by the following general formula (I):



(I)

wherein,

each of Ar_1 and Ar_2 stands for an aromatic hydrocarbon group, an aromatic heterocyclic group, each of which may have a substituent(s);

each of R_1 and R_2 stands for a hydrogen atom or an alkyl group, an aryl group or a heterocyclic group, each of which may have a substituent(s); and

C_p stands for a coupler residual group.

4,882,256

PHOTOSENSITIVE MEMBER HAVING AN OVERCOAT LAYER COMPRISING AMORPHOUS CARBON

Izumi Osawa, Ikeda; Syuji Iino, Hirakata; Hideo Hotomi, Suita; Kenji Masaki, Osaka, and Isao Doi, Toyonaka, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Oct. 13, 1987, Ser. No. 107,541

Claims priority, application Japan, Oct. 14, 1986, 61-245080; Oct. 14, 1986, 61-245081; Oct. 14, 1986, 61-245082; Jul. 15, 1987, 62-178051; Jul. 15, 1987, 62-178052

Int. Cl.[4] G03G 5/14

U.S. Cl. 430—66 22 Claims

1. A photosensitive member comprising:

an electrically conductive substrate;

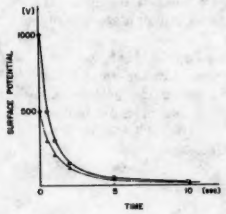
an organic photoconductive layer comprising an organic material as a matrix; and

an overcoat layer formed on said photoconductive layer by an organic plasma polymerization with said substrate heated to a temperature not exceeding 100° C. and comprising amorphous carbon containing hydrogen, said overcoat layer containing one or more atoms selected from the group consisting of halogen, oxygen and nitrogen, and said overcoat layer having a thickness of about 0.01 to about 5 microns.

4,882,257
ELECTROPHOTOGRAPHIC DEVICE

Akio Maruyama, Tokyo; Teigo Sakakibara, Yokohama, and Yuichi Hashimoto, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 24, 1988, Ser. No. 197,962
Claims priority, application Japan, May 27, 1987, 62-128064
Int. Cl.[4] G03G *13/22*
U.S. Cl. 430—100 6 Claims



1. An electrophotographic process performing reversal development to develop the portion with lower absolute value of potential and performing at least primary charging imagewise exposure, developing and cleaning on a photosensitive member of the lamination type which uses a layer coated with a dispersed organic pigment as the charge generation layer, wherein the potential of the photosensitive member and process conditions are under constant conditions, said constant conditions being within the range as defined by the following formula of Vd, t and V_H, when the surface potential of the photosensitive member immediately after charged with a primary charger is defined as Vd (V), the time from primary charging to toner development as t (sec) and further the surface potential of the photosensitive member at which the toner developing density becomes the half value of the saturated density as V_H (V):

$$|V_H| \leqq (|Vd|^{-0.65} + 1.35 \times 10^{-2} t)^{-1.54}$$

(Vd, V_H are of the same sign.).

4,882,258
TONER FOR DEVELOPMENT OF ELECTROSTATIC IMAGE AND ELECTROSTATIC LATENT IMAGE DEVELOPER

Satoru Ikeuchi; Mitutaka Arai; Yuki Okuyama, and Akitoshi Matsubara, all of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Feb. 29, 1988, Ser. No. 161,784
Claims priority, application Japan, Mar. 4, 1987, 62-49618; Mar. 5, 1987, 62-52427; Mar. 5, 1987, 62-52431
Int. Cl.[4] G03G *9/10, 9/14, 9/08*
U.S. Cl. 430—108 18 Claims

1. A toner for developing an electrostatic image comprising a mixture of a lower molecular weight polymer component and a higher molecular weight polymer toner

said lower molecular weight polymer component being a resin obtained by reacting

a polymer comprising a styrene monomer, an acrylate or methacrylate monomer, and a half-ester compound obtained by esterification reaction of an acrylic acid derivative having a hydroxy group or a methacrylic acid derivative having a hydroxy group, with a dicarboxylic acid;

with a polyvalent metal compound to form cross-linking through the metal atom, a local maximum value of said lower molecular weight polymer component being 1×10^3 to 2×10^4, a local maximum value of said higher molecular weight polymer component being 1×10^5 to 2×10^6, said toner further containing an offset preventive agent.

10. An electrostatic image developer comprising toner particles containing a resin obtained by reacting a carboxy group of a polymer component with a polyvalent metal compound and, magnetic carrier particles surface coated with a fluorine-containing resin, said toner particles having a molecular weight distribution into at least a lower molecular weight polymer component and a higher molecular weight polymer component, a local maximum value of said lower molecular weight polymer component being 1×10^3 to 2×10^4, a local maximum value of said higher molecular weight polymer component being 1×10^5 to 2×10^6, said lower molecular weight polymer component being a resin obtained by reacting a polymer comprising a stryene monomer, an acrylate or methacrylic monomer, and a half-ester compound obtained by esterification reaction of an acrylic acid derivative having a hydroxy group or methacrylic acid derivative having a hydroxy group, with a dicarboxylic acid.

4,882,259
PHOTOSENSITIVE IMAGING MATERIAL EMPLOYING PHOTOSENSITIVE MICROCAPSULES CONTAINING A SOLID DILUENT

Joseph G. O'Connor, and Paul C. Adair, both of Springboro, Ohio, assignors to The Mead Corporation, Dayton, Ohio

Continuation of Ser. No. 659,151, Oct. 9, 1984, abandoned, and a continuation of Ser. No. 814,521, Dec. 19, 1985, abandoned, which is a continuation of Ser. No. 643,569, Aug. 23, 1984, abandoned. This application Apr. 22, 1986, Ser. No. 855,032
Int. Cl.[4] G03C *172;* B41M *5/12*
U.S. Cl. 430—138 8 Claims

1. An imaging material comprising a support having on the surface thereof a layer of photosensitive microcapsules having discrete capsule walls, said microcapsules containing an internal phase including a photohardenable composition, an image-forming agent, and a solid diluent, said image-forming agent being a substantially colorless electron donating compound, said photohardenable composition including an ethylenically unsaturated compound and a photoinitiator system, and said solid diluent being miscible, as a melt, with said ethylenically unsaturated compound and not substantially inhibiting reaction of said photohardenable composition and having a melting point in the range of 35° C. to 100° C., said solid diluent being present in an amount of about 2.5 to 50 parts per 100 parts by weight of said photohardenable composition.

4,882,260
POSITIVE-WORKING PHOTOSENSITIVE QUINONE DIAZIDE COMPOSITION WITH ALKALI INSOLUBLE DYE AND ALKALI SOLUBLE DYE

Hidekatsu Kohara, Chigasaki; Nobuo Tokutake, Samukawa; Masanori Miyabe, Sagamihara; Toshimasa Nakayama, Hiratsuka; Shingo Asaumi, Fujisawa; Hatsuyuki Tanaka, Samukawa, and Yoshiaki Arai, Yokohama, all of Japan, assignors to Tokyo Ohka Kogyo Co., Ltd., Lamagawa, Japan

Filed Jun. 5, 1987, Ser. No. 59,556
Claims priority, application Japan, Jun. 16, 1986, 61-138143
Int. Cl.[4] G03C *1/60*
U.S. Cl. 430—191 5 Claims

1. A positive-working photosensitive composition which is a mixture consisting essentially of:

(A) an alkali soluble film-forming polymeric resin;

(B) a photosensitizer which is a quinome diozide;

(C) an alkali-insoluble dye soluble in oils and organic solvents having absorptivity of light in the wavelength region from 230 to 500 nm having no phenolic hydroxy group; and

(D) an alkali-soluble dye soluble in oils and organic solvents having absorptivity of light in the wavelength region from 230 to 500 nm having at least one phenolic hydroxy group

in a molecule; the total amount of the components (C) and (D) being in the range from 0.5 to 10% by weight based on the total amount of the components (A) and (B), and the components (C) and (D) are contained in a weight ratio in the range from 1:1 to 1:4.

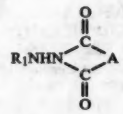
4,882,261

HIGH CONTRAST DOT ENHANCING COMPOSITIONS AND PHOTOGRAPHIC PRODUCTS AND METHODS FOR THEIR USE

Yasuhiko Kojima, Fairlawn; John Pilot, Carteret, and Burton H. Waxman, Rockaway, all of N.J., assignors to Polychrome Corp., Yonkers, N.Y. and Dainippon Ink & Chemicals, Inc., Japan

Filed Jun. 27, 1988, Ser. No. 211,980
Int. Cl.[4] G03C *1/06*
U.S. Cl. 430—264 18 Claims

1. A photographic light sensitive material comprising a support having thereon at least one silver halide photographic emulsion layer, said photographic light sensitive material further comprising an effective amount of a dot enhancing agent of the general formula:



(I)

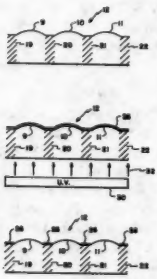
wherein R_1 is an aromatic group and A is a substituted or unsubstituted aromatic nucleus, and wherein each of the two carboxyl groups specifically depicted in said general formula (I) is bound to a different carbon atom of said aromatic nucleus.

4,882,262

SELF-ALIGNING APERTURE

Dennis J. Wilwerding, Littleton, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Sep. 28, 1987, Ser. No. 102,059
Int. Cl.[4] G03C *5/00*
U.S. Cl. 430—321 10 Claims



1. The method of applying a material between the lenslets of a lenslet array, which array includes a body of material with a first surface upon which the lenslets are formed in first areas with second areas therebetween and a second surface spaced from the first surface and with at least partly opaque portions in said body extending between the first and second surfaces under only the second areas comprising the steps of:

A. applying a photoresist over the first surface;

B. shining an ultraviolet light through the body of material from the second surface to the first surface, the at least partly opaque portion of the body blocking a portion of the light from reaching the second areas so that they are affected differently by the light than the first areas to facilitate photoresist removal in one of the first and second areas; and

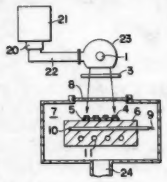
C. removing the photoresist from one of the first and second areas.

4,882,263

METHOD OF TREATING PHOTORESISTS

Shinji Suzuki, Kawasaki; Tetsuji Arai, Yokohama; Kazuyoshi Ueki, Kawasaki; Yoshiki Mimura, Yokohama, and Hiroko Suzuki, Kawasaki, all of Japan, assignors to Usho Denki, Tokyo, Japan

Filed Jan. 22, 1988, Ser. No. 146,927
Claims priority, application Japan, Mar. 24, 1987, 62-67890
The portion of the term of this patent subsequent to Feb. 1, 1989, has been disclaimed.
Int. Cl.[4] G03C *5/16*
U.S. Cl. 430—328 2 Claims



1. A method of enhancing thermal stability of a developed positive photoresist image on a semiconductor wafer comprising the steps of:

energizing a microwave-excited electrodeless discharge lamp to provide a range of radiant energy including wavelengths of 300 nm to 500 nm,

selectively filtering wavelengths in the spectral response region of said photoresist image from said radiant energy,

placing the developed positive photoresist image in a chamber having a gas at a pressure lower than 1×10^{-1} torr atmospheric pressure, and exposing said photoresist image to the wavelengths remaining in said radiant energy after said filtering step.

4,882,264

COLOR DEVELOPER COMPOSITION

Hongzoon Kim, Boonton; Edward C. Saunders, Oakland, and Harris Miller, Fort Lee, all of N.J., assignors to Olin Hunt Specialty Products Inc., Cheshire, Conn.

Filed Jan. 20, 1984, Ser. No. 572,646
Int. Cl.[4] G03C *5/30, 7/30*
U.S. Cl. 430—467 1 Claim

1. A color developer composition for use in developing color print paper, wherein the color developer composition comprises 4-amino-3-methyl-N-ethyl-N-beta-methanesulfonamidoethyl aniline or a salt thereof, 4-amino-3-methyl-N-ehtyl-N-beta hydroxyethyl aminline or a salt thereof, and 4-amino-3-methyl-N-diethyl aniline or a salt thereof.

4,882,265

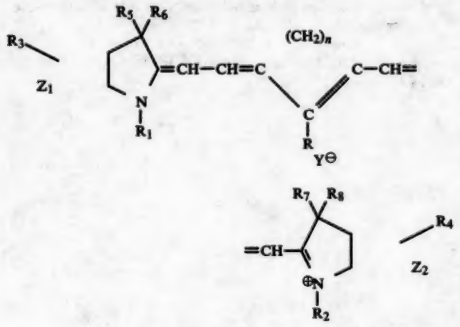
INFRARED LASER RECORDING FILM

Evan D. Laganis, Wilmington, Del., and Alden D. West, Hendersonville, N.C., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 18, 1988, Ser. No. 195,231
Int. Cl.[4] G03C *1/84*
U.S. Cl. 430—522 6 Claims

1. A photographic recording element containing an infrared absorbing dye layer comprising a support, at least one silver halide layer coated on side of the support, and coated on the

other side of the support a hydrophilic binder layer containing an absorbing amount of a dye substantially water insoluble at ambient temperature with the following structure:



wherein R is hydrogen, alkyl, cycloalkyl, aryl, substituted aryl, F, Cl, or Br; R_1 and R_2 are independently $-(CH_2)_{n1}-X$ wherein X is H, F, Cl, Br, phenyl, methyl, ethyl, cycloalkyl of 3 to 7 carbon atoms or alkoxy of 1 to 3 carbon atoms, and n_1 is an integer of 2 to 6; Z_1 and Z_2 independently represent the atoms necessary to complete an indole, benzindole or naphthindole nucleus or R3 and R4 independently represent methyl, ethyl, methoxy, ethoxy, hydroxy, F, Cl or Br substitutions on Z_1 and Z_2, respectively; R_5, R_6, R_7 and R_8 each independently represent methyl, ethyl, or R_5 and R_6 or R_7 and R_8, when taken together with the carbon atoms to which they are attached may form a 5- or 6-membered cycloalkyl group; n is an integer from 2 to 4; and y is a counter ion.

4,882,266

SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL CONTAINING A PYRAZOLOAZOLE MAGENTA COUPLER

Toshio Kawagishi, and Kiyoshi Nakazyo, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

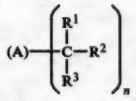
Continuation of Ser. No. 224,245, Jul. 25, 1988, which is a continuation-in-part of Ser. No. 42,549, Apr. 27, 1987, abandoned, which is a continuation of Ser. No. 773,156, Sep. 6, 1985, abandoned. This application Feb. 7, 1989, Ser. No. 307,020

Claims priority, application Japan, Sep. 6, 1984, 59-187203

Int. Cl.[4] G03C *7/38*

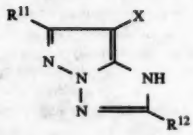
U.S. Cl. 430—546 **9 Claims**

1. A silver halide color photographic material comprising a support having coated thereon at least one silver halide emulsion layer, in which said silver halide emulsion layer or a layer adjacent thereto contains a magenta image-providing pyrazoloazole magenta coupler having substantially no dissolution in a developing solution and having at least one substituted alkyl group represented by the formula (I):



(I)

wherein (A) represents a pyrazoloazole magenta coupler residual group; R^1 is an alkyl group; R^2 and R^3 each is a hydrogen atom or a substituent, provided that both R^2 and R^3 are not hydrogen atoms at the same time; and n is 1 or 2, wherein said coupler is a coupler represented by the formula (VI):



(VI)

wherein at least one of R^{11} and R^{12} in formulae (VI) is an alkyl group of

R^1 is a straight chain or branched chain or cyclic alkyl group; R^2 and R^3 each is a hydrogen atom or an alkyl group, provided that both R^2 and R^3 are not hydrogen atoms at the same time; when the substituents represented by R^{11} and R^{12} in formula (VI) are substituents other than the alkyl group of

said substituents each is a hydrogen atom, a halogen atom, an alkyl group, an aryl group, a heterocyclic group, a cyano group, an alkoxy group, an aryloxy group, an acyloxy group, a carbamoyloxy group, a silyloxy group, a sulfonyloxy group, an acylamino group, an anilino group, a ureido group, an imido group, a sulfamoylamino group, a carbamoylamino group, an alkylthio group, an arylthio group, an alkoxycarbonylamino group, an aryloxycarbonylamino group, a sulfonamido group, a carbamoyl group, an acyl group, a sulfamoyl group, a sulfonyl group, sulfinyl group, an alkoxycarbonyl group, an aryloxycarbonyl group, a hydroxy group, an amino group or a carboxyl group; X is a hydrogen atom, a halogen atom, a carboxyl group, a group bonded via an oxygen atom or a group bonded via a sulfur atom; when R^{11}, R^{12} or X is a divalent group, the coupler of the formula (VI) forms a di- or polymer; and when R^{11}, R^{12} or X is a linking group, the coupler of the formula (VI) constitutes a partial structure of a vinyl monomer, in which said partial structure and the vinyl group are bonded via said linking group and wherein a

group is bonded directly to the pyrazoloazole nucleus at a position to which at least one of R^{11} and R^{12} is bonded.

6. A silver halide color photographic material as in claim 1, wherein said coupler is dissolved in droplets of a phosphoric or phosphonic ester as a high boiling organic solvent.

4,882,267

SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL WITH EXCELLENT COLOR REPRODUCIBILITY

Shigeto Hirabayashi, and Hirokazu Sato, both of Tokyo, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Dec. 2, 1987, Ser. No. 127,920

Claims priority, application Japan, Dec. 2, 1986, 61-287274

Int. Cl.[4] G03C *7/34, 7/26*

U.S. Cl. 430—546 **20 Claims**

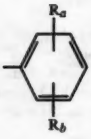
1. A silver halide photographic light-sensitive material com-

prising a support having thereon a blue-sensitive silver halide emulsion layer, a green-sensitive silver halide emulsion layer and a red-sensitive silver halide emulsion layer, wherein said red-sensitive silver halide emulsion layer contains a non-color-forming compound represented by the following Formula [I], a compound represented by the following Formula [II] and at least one cyan coupler represented by the following Formula [III] or [IV]:

$$R_1—NHSO_2—R_2 \qquad \text{Formula[I]}$$

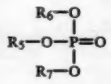
wherein R_1 is a group represented by the following Formula I_a and R_2 is an alkyl group, an aryl group or a dialklamino group, which is allowed to have a substituent;

Formula [I_a]



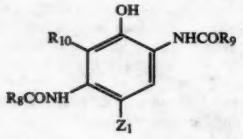
wherein R_a and R_b are individually hydrogen, halogen, alkyl, nitro, alkoxyl, cyano, dialylamino, acyl or alkoxylcarbonyl;

Formula [II]



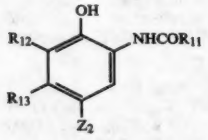
wherein R_5, R_6 and R_7 are individually an alkyl group, a cycloalkyl group or an aryl group, and each group represented by R_5 through R_7 is allowed to have a substituent;

Formula [III]



wherein R_8 is an alkyl group or an aryl group; R_9 is an alkyl group, a cycloalkyl group, an aryl group or a heterocyclic group; R_{10} is a hydrogen atom, a halogen atom, an alkyl group or an alkoxy group, and R_{10} is allowed to bond with R_8 to form a ring; Z_1 is a hydrogen atom or a group capable of being released upon reaction with the oxidized product of an aromatic primary amine color developing agent; and each group represented by R_8 through R_{10} is allowed to have a substituent;

Formula [IV]



wherein R_{11} is a ballast group: R_{12} is a hydrogen atom, a halogen atom or an alkyl group; R_{13} is an alkyl group having two to six carbon atoms; Z_2 is a hydrogen atom or a group capable of being released upon reaction with the oxidized product of an aromatic primary amine color developing agent; and each group represented by R_{11} through R_{13} is allowed to have a substituent.

4,882,268

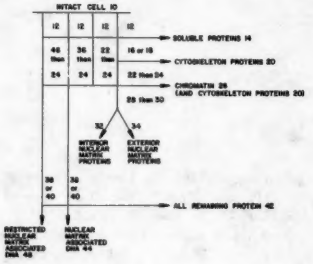
METHOD FOR DETERMINING TISSUE OF ORIGIN AND DEGREE OF MALIGNANCY OF TUMOR CELLS

Sheldon Penman, Brookline, and Edward G. Fey, Boston, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Dec. 24, 1985, Ser. No. 812,955

Int. Cl.[4] C12Q *1/68, 1/02;* G01N *33/53;* C07G *15/00*

U.S. Cl. 435—5 **29 Claims**



1. A method for determining the tissue of origin of a cell and degree the presence of malignancy comprising:

(a) isolating interior nuclear matrix proteins from at least one type of cell of known origin;

(b) separating the isolated nuclear matrix proteins by two-dimensional gel electrophoresis and decting proteins specific to the type of cells;

(c) isolating interior nuclear matrix proteins from cells of unknown origin;

(d) separating the nuclear matrix proteins from cells of unknown origin by two-dimensional gel electrophoresis;

(e) comparing the separated interior nuclear matrix proteins from cells of unknown origin with the separated, identified interior nuclear matrix proteins of known origin; and

(f) determining the tissue of origin and the presence of malignancy of the cell of unknown origin.

2. The method of claim 1 wherein the interior nuclear matrix proteins are isolated from proteins soluble in a physiological detergent solution, cytoskeleton proteins, chromatin, and the exterior nuclear matrix proteins including the intermediate filaments by:

(a) extracting eucaryotic cells with a non-ionic detergent solution at physiological pH and ionic strength to extract the proteins in the nucleus and cytoskeleton which are soluble in the physiological detergent solution;

(b) separating the nuclear matrix proteins from the cytoskeleton proteins remaining in the extracted cells of step a by solubilizing the cytoskeleton proteins in a solution which does not dissolve the nuclear proteins;

(c) separating the chromatin from the nuclear matrix proteins by digesting the insoluble material from step b with DNAse and RNAase and dissolving the chromatin with a buffered ammonium sulfate solution;

(d) separating the interior and exterior proteins of the nuclear matrix by first dissolving the insoluble nuclear matrix proteins from step c in urea and then dialyzing the dissolved proteins back into a physiological buffer, wherein the interior nuclear matrix proteins, are soluble in the physiological buffer and the exterior nuclear matrix proteins are insoluble.

4,882,269

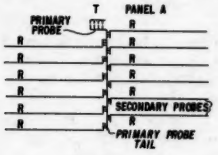
AMPLIFIED HYBRIDIZATION ASSAY

Robert J. Schneider, New York, N.Y., and Thomas E. Shenk, Princeton, N.J., assignors to Princeton University, Princeton, N.J.

Continuation-in-part of Ser. No. 808,695, Dec. 13, 1985. This application Dec. 11, 1986, Ser. No. 940,712

Int. Cl.[4] C12Q *1/68, 1/42;* C07H *21/00*

U.S. Cl. 435—6 **62 Claims**



1. A method for the detection of a target nucleotide sequence, comprising:

(a) contacting the target nucleotide under conditions that permit hybridization with (i) a primary probe which comprises a polynucleotide sequence that is complementary to the target nucleotide sequence and a polymeric tail that has binding sites that are incapable of binding to the target sequence, and (ii) a plurality of secondary probes comprising a family of signal-generating probes each member of which comprises a signal generating component and a polymer capable of binding to a different portion of the tail of the primary probe; and

(b) detecting the amplified signal generated by a reaction product formed in step (a), in which the polynucleotide sequence of the primary probe is hybridized to the target nucleotide and a plurality of secondary probes are bound to different portions of the primary probe tail.

4,882,270

MONOCLONAL ANTIBODIES TO PLACENTAL ISOFERRITIN FOR USE IN DETECTING ONCOFETAL FERRITIN ASSOCIATED WITH BREAST CANCER AND HODGKINS DISEASE

Chaya Moroz, 40 Yehuda Hanassi Street, Tel Aviv, Israel

Continuation of Ser. No. 568,275, Jan. 4, 1984, abandoned, which is a continuation-in-part of Ser. No. 373,715, Apr. 30, 1982, abandoned. This application Jan. 22, 1988, Ser. No. 148,133

Claims priority, application Israel, May 15, 1981, 62879

Int. Cl.[4] G01N *33/53, 33/577;* C12N *5/00;* C12P *21/00*

U.S. Cl. 435—7 **35 Claims**

1. Monoclonal antibodies which specifically bind to epitopes of human oncofetal ferritin antigens and which do not bind to epitopes of human spleen ferritin antigens or to epitopes of human liver ferritin antigens.

4,882,271

PROCESS FOR PREPARATION OF HIGH MOLECULAR WEIGHT CELL-ASSOCIATED PROTEIN OF CAMPYLOBACTER PYLORI AND USE FOR SEROLOGICAL DETECTION OF CAMPYLOBACTER PYLORI INFECTION

Dolores G. Evans; Doyle J. Evans, and David Y. Graham, all of Houston, Tex., assignors to Baylor College of Medicine, Houston, Tex.

Filed Mar. 10, 1988, Ser. No. 166,138

Int. Cl.[4] G01N *33/53, 33/543;* C12Q *1/58;* C07K *15/00*

U.S. Cl. 435—7 **9 Claims**

1. A composition comprising substantially purified antigens from the high molecular weight cell-associated proteins of *Campylobacter pylori*, said antigens:

having a molecular weight of about 300,000 to 700,000 daltons as determined by agarose A-5 m column;

having a PI on isolectric focusing of about 5.9 to 6.3;

having urease activity

being soluble in PBS and Tris-chloride buffers;

being derived from the outer surface of the membrane of *Campylobacter pylori*; and

being solubilized from the outer surface of the membrane with n-octyl-glucoside.

4,882,272

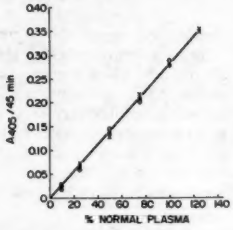
HIGH MOLECULAR WEIGHT KININOGEN ASSAY

Cheryl F. Scott, Bensalem, and Robert W. Colman, Moylan, both of Pa., assignors to Temple University - of the Commonwealth System of Higher Education, Philadelphia, Pa.

Continuation-in-part of Ser. No. 914,029, Oct. 1, 1989, abandoned. This application Feb. 6, 1987, Ser. No. 11,963

Int. Cl.[4] C12Q *1/56*

U.S. Cl. 435—13 **21 Claims**



1. An assay method for functional high molecular weight kininogen (HMWK) in plasma comprising:

(a) substantially completely inactivating plasma protease inhibitors in a plasma specimen;

(b) substantially completely inhibiting prekallikrein activation and kallikrein activity in the specimen;

(c) forming a reaction mixture comprising said specimen, a contact-activating surface and selected amounts of factor XIIa and factor XI to initiate HMWK-dependent activation of factor XI in the reaction mixture, the amounts of factor XIIa and factor XI being selected such that at a predetermined temperature and predetermined reaction time the concentration of functional HMWK in the reaction mixture is rate-limiting in the HMWK-dependent activation of factor XI and directly proportional to the concentration of factor XIa generated in the reaction mixture;

(d) substantially completely inactivating factor XIIa in the reaction mixture at the predetermined reaction time; and

(e) assaying the amount of factor XIa formed in the reaction mixture by measuring the hydrolysis of a substrate for factor XIa, said amount of factor XIa being directly proportional to the amount of functional HMWK in the plasma specimen.

4,882,273

METHOD OF SCREENING MICROORGANISMS FOR THE PRODUCTION OF EXTRACELLULAR ENZYMES

Robert O. Horwath, Westport, Conn., assignor to Nabisco Brands, Inc., East Hanover, N.J.

Filed Dec. 6, 1982, Ser. No. 447,046

Int. Cl.[4] C12Q *1/04, 1/34;* C12N *1/14, 1/00*

U.S. Cl. 435—34 **20 Claims**

9. A process for screening fungi for the increased production of extracellular enzyme which comprises the steps of:

(a) forming a screening plate comprising a suspension of fungi on a solid medium which promotes colonial, non-

sporulating growth and inhibits normal levels of extracellular enzyme activity to provide an inoculate medium;

(b) incubating said inoculated medium under conditions that promote extracellular enzyme synthesis; and

(c) identifying those colonies of fungus capable of increased extracellular enzyme synthesis by reacting the enzyme surrounding each colony with an analytically indicatable reagent.

4,882,274

METHOD FOR SOLUBILIZATION OF LOW-RANK COAL USING A CELL-FREE ENZYMATIC SYSTEM

John Pyne, Jr., Kennewick; Dorothy L. Stewart, Richland; James K. Fredrickson, Kennewick, all of Wash., and Martin S. Cohen, West Hartford, Conn., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Jul. 6, 1987, Ser. No. 69,709

Int. Cl.[4] C12P *21/00*; C12N *9/00*

U.S. Cl. 435—68 **7 Claims**

1. A method of isolating an extracellular product derived from a culture of white rot fungi comprising the steps of fermenting the culture of said fungi in a nutrient medium for a period of time sufficient to form extracellular fluid, separating the cells from said medium and filtering the resulting cell-free medium through a filtration means having a molecular weight cutoff of at least 10,000 molecular weight; subjecting the retentate of molecular weight greater than 10,000 to chromatographic separation to isolate a low-rank coal-degrading active fraction.

2. A method of degrading solid low-ranked coal to a water-soluble material by enzymatic action comprising the step of contacting said low-ranked coal with a cell-free extracellular material derived from fermentation of white rot fungi characterized by low-rank coal-degrading activity.

4,882,275

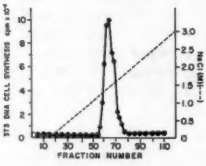
METHOD OF PURIFYING ENDOTHELIAL CELL GROWTH FACTORS USING IMMOBILIZED HEPARIN

Michael Klagsbrun, Newton, Mass., assignor to The Children's Medical Center Corporation, Boston, Mass.

Continuation-in-part of Ser. No. 584,604, Feb. 29, 1984, abandoned. This application Apr. 7, 1986, Ser. No. 849,045

Int. Cl.[4] C12P *21/00*; C07K *3/20*

U.S. Cl. 435—68 **15 Claims**



1. A method for purifying a crude solution comprising endothelial cell growth factor (ECG) comprising:

contacting immobilized heparin with said crude solution to form a complex between said ECG and said heparin;

separating uncomplexed solution from said complex;

eluting said ECG from said immobilized heparin by contacting said complex with a salt solution of a salt concentration and pH effective to separate said ECG from said heparin.

4,882,276

PROCESS FOR PRODUCING PHYSIOLOGICALLY ACTIVE SUBSTANCE BY MULTIENZYME PROCESS

Kazutomo Imahori, Tokyo; Hitoshi Kondo, Kyoto; Hiroshi Nakajima, Kyoto, and Tatsuo Iwasaki, Kyoto, all of Japan, assignors to Kazutomo Imahori; Rikagaku Kenkyusho and Unitika Ltd., all of, Japan

Filed Jan. 26, 1983, Ser. No. 461,308

Claims priority, application Japan, May 27, 1982, 57-90424

Int. Cl.[4] C12P *19/30, 19/40*; C12Q *3/00*

U.S. Cl. 435—89 **2 Claims**

1. A process for converting AMP into ATP comprising the steps of:

providing separately or together a first enzyme and a second enzyme into a reactor, the first enzyme being capable of converting AMP into ADP and having been produced from microorganisms having an optimum growth temperature of 50° C. to 85° C., and the second enzyme being capable of converting ADP to ATP and having been produced from microorganisms having an optimum growth temperature of 50° C. to 85° C.;

adding AMP into the reactor to form ATP;

removing ATP from the reactor in an amount such that the reaction will continue to proceed to completion in the conversion of AMP into ATP,and

mixing ATP as a phosphoric acid donor with AMP and adding the resulting mixture to the reactor,

wherein the reaction is carried out at a temperature which retains desired activity; and

wherein the mixing of AMP with ATP is carried out by controlling the concentration of ATP so as to satisfy the following formula (a):

$$0.15 \times \frac{5+r^2}{r^2} \times AMP \geqq ATP \geqq 0.04 \times \frac{5+r^2}{r^2} \times AMP \quad (a)$$

wherein AMP represents the concentration of AMP (mM), ATP represents the concentration of ATP (mM), and r represents a ratio of immobilized enzyme activity of the enzyme which converts ADP into ATP to immobilize enzyme activity of the enzyme which converts AMP into ADP, which is a positive integer of 1 or more.

4,882,277

CONTINUOUS PROCESS FOR PREPARING ORGANIC ACIDS BY FERMENTATION

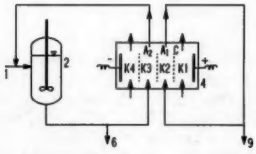
Michael Czytko, Bochum, Fed. Rep. of Germany; Kiyoshi Ishii, Himeji, and Kimitoshi Kawai, Hyogo, both of Japan, assignors to Hüls Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Dec. 19, 1986, Ser. No. 943,698

Claims priority, application Japan, Dec. 20, 1985, 60-287521

Int. Cl.[4] C12P *7/40, 7/56*

U.S. Cl. 435—136 **8 Claims**



1. A continuous process for the fermentative preparation of organic acids comprising passing a fermentation broth from a fermenter through an electrodialysis unit and back to the fermenter to recover a solution of organic acids wherein said electrodialysis is conducted in an electrodialysis unit having three compartments separated from each other by a cation

exchange membrane and an anion exchange membrane in this order from the side of an anode.

4,882,278

NON-TOXINOGENIC VIBRIO CHOLERAE MUTANTS

John J. Mekalanos, Framingham, Mass., assignor to President and Fellows of Harvard College, Cambridge, Mass.

Filed Apr. 29, 1983, Ser. No. 489,958

Int. Cl.[4] C12N *15/00, 1/20;* **C12R** *1/63*

U.S. Cl. 435—172.3 **13 Claims**

1. A nontoxinogenic genetically stable strain of *Vibrio cholerae* Ogawa 395 which is derived from a parent *V. cholerae* organism comprising at least two copies of a ctxA gene encoding a toxic A_1 peptide, said strain having a genetically engineered deletion mutation resulting in loss of at least a part of each copy of said ctxA gene required for expression of a toxic A_1 peptide.

4,882,279

SITE SELECTIVE GENOMIC MODIFICATION OF YEAST OF THE GENUS PICHIA

James M. Cregg, San Diego, Calif., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 25, 1985, Ser. No. 791,013

Int. Cl.[4] C12N *05/00, 15/00;* **C12P** *19/34*

U.S. Cl. 435—172.3 **16 Claims**

1. A process for the site selected genomic modification of *Pichia pastoris* at a predetermined genomic site which comprises transforming a host strain of *Pichia pastoris* with a serially arranged linear DNA fragment comprising

a first insertable DNA fragment,

a selectable marker gene, and

a second insertable DNA fragment;

wherein said first and second insertable DNA fragments are each at least about 200 nucleotides in length and have nucleotide sequences which are homologous with separate portions of the native *Pichia pastoris* genomic site at which genomic modification is to occur; wherein said first and second insertable DNA fragments are oriented with respect to one another in said linear DNA fragment as they are so oriented in the genomic with *Pichia pastoris;* wherein said marker gene is positioned between the first DNA insertable fragment and the second insertable DNA fragment and wherein said first and second insertable DNA fragments are selected from the group consisting of fragments of:

the alcohol oxidase genes, and

the histidinol dehydrogenase gene.

4,882,280

URICASE AND A METHOD FOR THE PREPARATION THEREOF

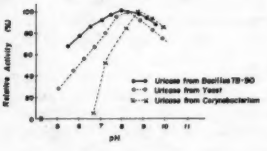
Masachika Takashio, Yaizu; Takahide Chikano, Shizuoka, and Minoru Kamimura, Yaizu, all of Japan, assignors to Sapporo Breweries Limited, Tokyo, Japan

Filed May 22, 1986, Ser. No. 866,572

Claims priority, application Japan, Jun. 5, 1985, 60-120399

Int. Cl.[4] C12N *1/20, 9/80, 9/06, 1/22;* **C12R** *1/07;* **C12Q** *1/62*

U.S. Cl. 435—228 **1 Claim**



1. A method for the preparation of a uricase capable of oxidatively decomposing uric acid and having activity therefor in a range of pH from 5 to 10 which comprises culturing a thermophilic microorganism designated Bacillus Sp TB-90 (FERM BP-795) in a nutrient culture medium for a time sufficient to produce the uricase and recovering the uricase.

4,882,281

PROBE FOR ELECTROFUSION, ELECTROPORATION, OR LIKE PROCEDURE

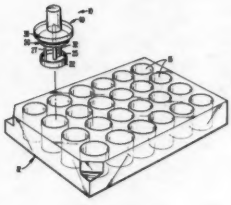
Jeffrey L. Hilliard, and Maurice M. Moloney, both of Davis, Calif., assignors to Jeffrey L. Hilliard, Davis, Calif.

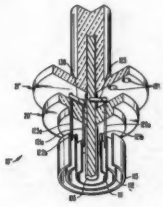
Continuation-in-part of Ser. No. 847,356, Apr. 2, 1986, Pat. No. 4,695,547. This application Aug. 26, 1986, Ser. No. 900,652

The portion of the term of this patent subsequent to Sep. 22, 2004, has been disclaimed.

Int. Cl.[4] C12M *1/00*

U.S. Cl. 435—287 **17 Claims**





1. A probe for subjecting a sample to an electric field, comprising:

a plurality of conductive rings sized for nesting without contacting one another, said rings including a number of odd-numbered rings, the smallest inner diameter ring of which is designated the first ring, and a number of even-numbered rings;

a conductive rod having a diameter less than the inner diameter of said first ring;

means for holding said rings and said rod in coaxial alignment;

means for establishing a first electric terminal coupled to said rod and said number of evennumbered rings; and

means for establishing a second electrical terminal coupled to said number of odd-numbered rings.

4,882,282

DNA SEQUENCES ENCODING BOVINE INTERLEUKIN-2

Dirk M. Anderson, Seattle; Paul E. Baker, Bainbridge Island; Michael A. Cantrell, Seattle; Douglas P. Cerretti, Seattle; David J. Cosman, Seattle; Steven D. Gimpel, Seattle; Kenneth H. Grabstein, Seattle; Alf D. Larsen, Seattle, and Kate N. McKereghan, Seattle, all of Wash., assignors to Immunex Corporation, Seattle, Wash.

Continuation-in-part of Ser. No. 766,643, Aug. 16, 1985, abandoned. This application Jul. 31, 1986, Ser. No. 888,994

Int. Cl.[4] C12N *1/00, 15/00;* **C12P** *2/00, 17/34*

U.S. Cl. 435—252.3 **6 Claims**

1. A purified and isolated DNA sequence encoding the amino acid sequence of mature bovine interleukin 2 (IL-2).

4,882,283

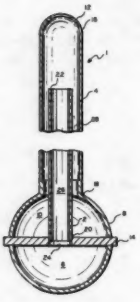
HEAT EXCHANGE APPARATUS

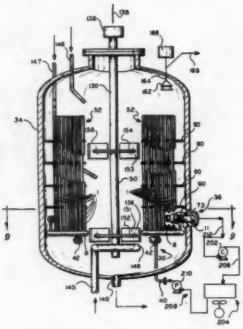
Cecil C. Gentry, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 17, 1987, Ser. No. 122,291

Int. Cl.[4] C12M *1/02*

U.S. Cl. 435—316 **15 Claims**





1. An apparatus comprising,

(a) a vessel capable of containing a liquid and a gas, said vessel being partly defined by a sidewall which defines a generally cylindrical inside surface, said vessel having a longitudinal axis about which the sidewall is generally symmetrically positioned;

(b) a pipe mounted in said vessel, said pipe having a sidewall;

(c) a partition mounted in said pipe dividing the inside of the pipe into a first chamber and a second chamber;

(d) a first tubular member having a first end attached to the sidewall of the pipe and a second end having a closure thereon;

(e) a second tubular member having a first end attached to the partition and a second end spaced apart from the end closure of the first tubular member, the second tubular member extending inside of the first tubular member; wherein a flow path is formed from the first chamber, through the second tubular member, through an annulus between the second tubular member and the first tubular member, and into the second chamber;

(f) a fluid inlet means extending through the sidewall of the vessel and connected to the first chamber wherein the fluid inlet means comprises a feed pipe extending through the sidewall of the vessel and a curved supply pipe extending generally circumferentially around the inside of the vessel at a position spaced apart from the sidewall of the vessel and connected to the first chamber by a riser feed;

(g) a fluid outlet means extending through the sidewall of the first vessel and connected to the second chamber wherein the fluid outlet means comprises a first exhaust pipe extending through the sidewall of the vessel connected to a curved collection pipe extending generally circumferentially around the inside of the vessel at a position spaced apart from the sidewall of the vessel and a riser exhaust pipe connecting the second chamber to the curved collection pipe.

10. A process comprising

(a) introducing a heat exchange fluid into a vessel through an inlet means extending through the vessel wall;

(b) distributing the heat exchange fluid from the inlet means into a plurality of first heat exchange tubes each having a first end and a second end and connected by the first end to the inlet means;

(c) flowing the first heat exchange fluid from the first end to the second end of the plurality of first heat exchange tubes;

(d) emitting the first heat exchange fluid from the second end of the first plurality of heat exchange tubes and into the first end of a second plurality of heat exchange tubes each concentrically positioned around a heat exchange tube of the first plurality and flowing the heat exchange fluid from the first end of the second plurality of heat exchange tubes, along a plurality of annuli defined between the first heat exchange tubes and the second heat exchange tubes, to a second end of the second heat exchange tubes;

(e) discharging the heat exchange fluid from the second end of the second heat exchange tubes and collecting the discharged heat exchange fluid in an exhaust means which extends through the vessel wall; and

(f) withdrawing the heat exchange fluid from the vessel through the exhaust means.

4,882,284

METHOD FOR QUANTITATING AND DIFFERENTIATING WHITE BLOOD CELLS

Stefan J. Kirchanski, Framingham, and Kathleen Wardwell, Roxbury, both of Mass., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Apr. 13, 1987, Ser. No. 37,769

Int. Cl.[4] G01N *15/10, 21/75, 33/50*

U.S. Cl. 436—63 **24 Claims**

1. A method for discriminating white blood cells from red blood cells and platelets in unlysed, whole blood comprising:

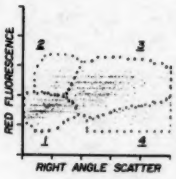
a. providing an aliquot of unlysed, whole blood to be studied;

b. diluting the aliquot in one step with a reagent consisting essentially of an isotonic solution of a red light absorbing, fluorescent dye, and permitting the aliquot to be in contact with the reagent for a time period sufficient for the dye to differentially stain cells in the aliquot;

c. passing at least a portion of the diluted aliquot, substantially a cell at a time, through an area and stimulating each

cell passed through said area with red fluorescent optical stimulation;

d. detecting and measuring forward angle light scatter, right angle light scatter and red fluorescence from each stimulated cell; and



e. discriminating white blood cells from red blood cells and platelets in the aliquot on the basis that white blood cells have different forward angle scatter, right angle scatter and red fluorescent staning properties than red blood cells and platelets.

4,882,285

PROCESS FOR MONITORING THE QUANTITY OF DIMETHYL HYDANTOIN

John W. Ogleby, and Neville J. Charkley, both of Warrington, United Kingdom, assignors to Laporte Industries Limited, London, England

Filed Feb. 22, 1989, Ser. No. 313,752

Claims priority, application United Kingdom, Feb. 25, 1988, 8804460

Int. Cl.[4] G01N *31/22, 33/00*

U.S. Cl. 436—98 **4 Claims**

1. A process for monitoring the quantity of dimethyl hydantoin in a water having a pH of about 7.4 to about 7.8 comprising contacting a volume of a base of known normality with a volume of the water and determining the quantity of dimethyl hydantoin therein according to the non-stoichiometric relationship 0.2×10^{-4} equivalents of base=3.33 mg of dimethyl hydantoin by a procedure selected from:

(a) adding a sufficient volume of the base to a given volume of the water or adding a sufficient volume of the water to a given volume of the base to attain a pH of 9.3 in the water so as to determine the actual quantity of dimethyl hydantoin in the water, or

(b) adding a volume of the base corresponding to a preselected concentration level of dimethyl hydantoin to a given volume of the water and determining the deviation of the pH of the water above or below 9.3 to determine the deviation of the concentration of dimethyl hydantoin respectively below or above that level in the water

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4,882,286

DIGESTION APPARATUS USEFUL FOR A KJELDAHL METHOD

Edwin D. Neas, Indian Trail, N.C., and Terry S. Floyd, Clover, S.C., assignors to CEM Corporation, Matthews, N.C.

Continuation of Ser. No. 874,278, Jun. 13, 1986, abandoned. This application Oct. 2, 1987, Ser. No. 104,569

Int. Cl.[4] G01N *1/00*

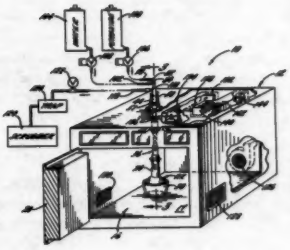
U.S. Cl. 436—175 **10 Claims**

1. Microwave-based apparatus useful for digestion, comprising

(a) a microwave system having a wall with means defining an aperture formed therethrough, said microwave system comprising an internal chamber formed in part by an interior surface of said wall;

(b) a reaction vessel disposed within said internal chamber, a portion of said reaction vessel being insulated;

(c) a connector tube slidably disposed in said aperture of said wall, said connector tube having a portion exterior to said internal chamber and a portion that extends into said internal chamber, an end of said slidably disposed connector tube being joined to a mouth of said reaction vessel by biasing means located outside said internal chamber; and



(d) external suction means connected to said connector tube.

4,882,287

PROCESS FOR INDICATING THE PRESENCE OF TOXIC SUBSTANCES IN AIR THAT IS SUPPLIED TO A PERSONNEL-OCCUPIED SPACE

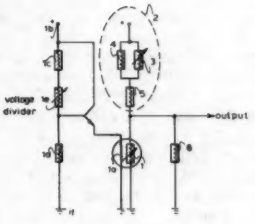
Heinz Hölter; Heinrich Igelbüscher, both of Gladbeck; Heinrich Gresch, Dortmund-Wickede; Heribert Dewert, Gladbeck, and Hanns Rump, Unna-Massen, all of Fed. Rep. of Germany, assignors to Heinz Holter, Gladbeck, Fed. Rep. of Germany

Continuation of Ser. No. 30,867, Mar. 13, 1987, abandoned. This application Oct. 5, 1988, Ser. No. 256,145

Claims priority, application Fed. Rep. of Germany, Jul. 19, 1985, 3525774; Apr. 28, 1986, 3614314; May 13, 1986, 3616052

Int. Cl.[4] G01N *25/18, 31/00*

U.S. Cl. 436—149 **5 Claims**



1. A process for indicating a presence of a toxic component to be measured of an air stream supplied to a personnel-occupied space, comprising the steps of:

(a) dividing the air stream into two portions by passing said air stream through a barrier for the toxic component in the air stream thereby separating a first portion of the air stream comprising said toxic component to be measured from a second portion containing less of said component;

(b) passing said first portion with said toxic component to be measured of said air stream into contact with an electrical sensor for said component to be measured and detecting an electrical output across said sensor signalling the detection of said component;

(c) juxtaposing said sensor with an electrical heater and controlling a voltage applied to said heater with a first voltage divider in electrical circuit with said heater provided with a first temperature-compensating component connected to a voltage source in response to temperature of said air stream to provide a substantially constant heat output at said heater;

(d) electrically connecting said sensor in electrical series

with an external electrical resistance to form a second voltage divider connected to a voltage source, including a second temperature-compensating component, and independent from said first voltage divider; and

(e) matching said temperature-compensating components so that said voltage dividers compensate each other with respect to a temperature response of the output across said sensor proportional with concentration of said toxic component to be measured to eliminate a temperature effect upon the detection of said toxic component.

4,882,288

ASSAY TECHNIQUE AND EQUIPMENT

John R. North, 2 Cockhall Close, Litlington, Royston, Herts. SG8 0RB; Satham Petty-Saphon, Blythburgh House, Wendens Ambo, Saffron Walden, Essex CB11 4JU, and Craig G. Sawyers, 196 Icknield Way, Letchworth, Herts. SG6 4AE, all of United Kingdom

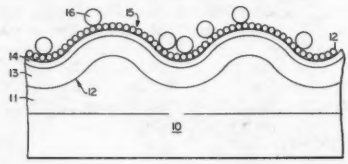
PCT No. PCT/GB85/00427, § 371 Date May 14, 1986, § 102(e) Date May 14, 1986, PCT Pub. No. WO86/01901, PCT Pub. Date Mar. 27, 1986

PCT Filed Sep. 16, 1985, Ser. No. 866,080

Claims priority, application United Kingdom, Sep. 14, 1984, 8423204

Int. Cl.[4] G01N *33/553, 33/552, 33/545, 33/577*

U.S. Cl. 436—525 **25 Claims**



1. An article for use in an assay technique for qualitative and/or quantitative detection of a chemical, biochemical or biological species in a sample, which article comprises a substrate having a surface with a pre-formed relief profile which is optically active with respect to radiation at least over a predetermined band of wavelengths, and at least a predetermined part of which surface is coated with a thin film of a material capable of binding a predetermined chemical or biochemical or biological species, said thin film of material incorporating molecules of a fluorescent compound whose fluorescent properties show an observable dependence upon its molecular environment.

4,882,289

METHOD OF MAKING A SEMICONDUCTOR MEMORY DEVICE WITH RECESSED ARRAY REGION

Noboru Moriuchi; Yoshiki Yamaguchi; Toshihiko Tanaka, all of Tokyo; Norio Hasegawa, Hinode; Yoshifumi Kawamoto, Kanagawa; Shin-ichiro Kimura, Hachioji; Toru Kaga, Urawa, and Tokuo Kure, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 22, 1988, Ser. No. 184,786

Claims priority, application Japan, Apr. 24, 1987, 62-99741

Int. Cl.[4] H01L *21/308, 24/78*

U.S. Cl. 437—52 **7 Claims**

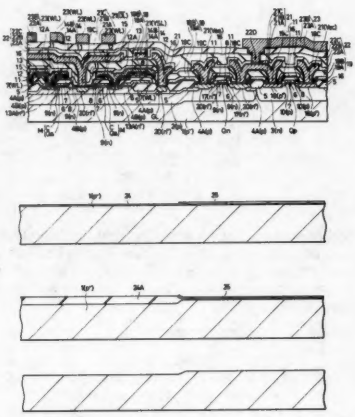
1. A method of manufacturing a semiconductor memory comprising the steps of:

(a) selectively forming an oxidation-proof film to the first region of semiconductor substrate having the flat surface;

(b) forming an oxide film to the second region other than the first region of said semiconductor substrate with said oxidation-proof film used as the mask;

(c) forming a recessed part to the flat semiconductor substrate by removing an oxide film formed on said second region;

(d) forming a memory cell region comprising a plurality of memory cells to said second region; and



(e) forming a peripheral circuit region comprising a plurality of MISFETs to said first region.

4,882,290

SEMICONDUCTOR DEVICE AND A METHOD OF MANUFACTURING THE SAME

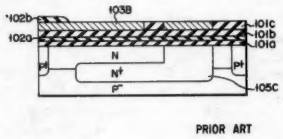
Shigeru Komatsu, Kitakyushu, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 25, 1988, Ser. No. 148,351

Claims priority, application Japan, Jan. 26, 1987, 62-14152

Int. Cl.[4] H01L *21/265, 21/225*

U.S. Cl. 437—31 **1 Claim**



PRIOR ART

1. A method of manufacturing a semiconductor device comprising the steps of:

forming an insulating layer in a semiconductor substrate, for defining a semiconductor region of a first conductivity type separated from other semiconductor regions;

forming a polysilicon semiconductor layer on said semiconductor substrate:

patterning said polysilicon semiconductor layer to form an emitter leading electrode and a base leading electrode;

implanting a second conductivity type impurity ion into said base leading electrode;

thermally heating the implanted ion to diffuse the ion into said semiconductor region to form a first region of the second condcutivity type;

implanting a second conductivity type impurity ion into said emitter leading electrode and that portion of said semiconductor region on which said emitter leading electrode or said base leading electrode are not formed;

thermally heating the last-recited ion to form a second region of the second conductivity type, which is in contact with and shallower than said first region of the second conductivity type, and at the same time diffusing the

second conductivity type impurity from said emitter leading electrode into said semiconductor region, so that a third region of the second conductivity type is formed in said semiconductor region, and which is in contact with and shallower than said second region of the second conductivity type; and

implanting a first conductivity type impurity ion into said emitter leading electrode, and thermally heating the implanted ion to form a first conductivity type region constituting an emitter region in said third region of the second conductivity type.

4,882,291

PROCESS FOR THE PRODUCTION OF ELECTRICAL ISOLATION ZONES IN A CMOS INTEGRATED CIRCUIT

Pierre Jeuch, Seyssins, France, assignor to Commissiriat A l'Energie Atomique, Paris, France

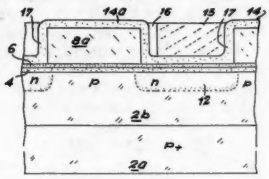
PCT No. PCT/FR88/00041, § 371 Date Aug. 16, 1988, § 102(e) Date Aug. 16, 1988, PCT Pub. No. WO88/05602, PCT Pub. Date Jul. 28, 1988

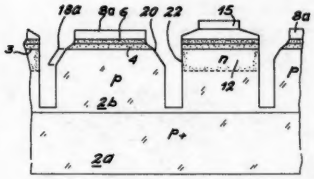
PCT Filed Jan. 26, 1988, Ser. No. 249,189

Claims priority, application France, Jan. 26, 1987, 87 00861

Int. Cl.[4] H01L *21/76*

U.S. Cl. 437—34 **15 Claims**





1. A process for the production of electrical isolation zones for isolating the n regions from the p regions of a CMOS integrated circuit formed on a silicon substrate, comprising the steps of:

(a) producing a first mask on the surface of the silicon substrate, said first mask having first patterns which mask at least a part of the p regions;

(b) producing a second mask on the surface of the silicon substrate, said second mask having second patterns which mask at least a part of the n regions, steps (a) and (b) being interchangable in that either step may be performed before the other;

(c) etching the unmasked regions of the silicon substrate so as to form electrical isolation trenches;

(d) anisotropically etching the silicon substrate while simultaneously isotropically etching the patterns of the first mask and forming inclined sides in the upper part of the trenches so that the electrical isolation trenches become wider towards the upper surface of the silicon substrate; and

wherein the second mask can be selectively etched with respect to the first mask, the first and second patterns being spaced apart and defining between them the location and the width of the electrical iolation trenches produced between the n regions and the p regions.

4,882,292

PROCESS FOR MANUFACTURING A REFET OR A CHEMFET, AND THE MANUFACTURED REFET OR CHEMFET

Ernst J. Sudhölter, Losser; Maria D. Skowronska-Ptasinska, Enschede; Peter D. Van der Wal, Enschede; Albert Van den Berg, Enschede, and David N. Reinhoudt, Hengelo, all of Netherlands, assignors to Stichting Centrum voor Micro-Elektronics Twente, Enschede, Netherlands

Filed Sep. 4, 1987, Ser. No. 93,014

Claims priority, application Netherlands, Sep. 5, 1986, 8602242

Int. Cl.[4] G01N *27/00*; H01L *29/28*

U.S. Cl. 437—42 **21 Claims**

1. Process for manufacturing a REFET or a CHEMFET, comprising:

(a) covalently bonding a hydrophilic polymer layer to an insulating layer applied to a semiconductor material;

(b) absorbing water or an aqueous solution into said hydrophilic polymer layer; and

(c) binding a hydrophobic polymer layer to the water containing hydrophilic polymer layer.

4,882,293

METHOD OF MAKING AN ELECTRICALLY PROGRAMMABLE INTEGRATED CIRCUIT CONTAINING MELTABLE CONTACT BRIDGES

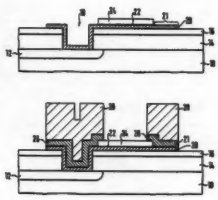
Jorg Naumann, Weinheim; Thomas Sharnagl, Freising, and Leo Stroth, Wolfersdorf, all of Fed. Rep. of Germany, assignors to Texas Instruments Deutschland GmbH, Dallas, Tex.

Continuation of Ser. No. 244,962, Sep. 15, 1988, abandoned. This application Feb. 15, 1989, Ser. No. 312,358

Claims priority, application Fed. Rep. of Germany, Sep. 19, 1987, 3731621

Int. Cl.[4] H01L *21/283, 21/308*

U.S. Cl. 437—52 **10 Claims**



1. A method of making an electrically programmable integrated circuit comprising:

providing a substrate of semiconductor material having at least one circuit-function defining zone provided with electrical conductivity and opening onto the top surface thereof;

forming a first protective layer resistant to plasma etching on said semiconductor substrate and covering the top surface thereof;

selectively patterning said first protective layer resistant to plasma etching to form an aperture extending therethrough to at least a portion of said at least one zone exposing a contact area of said at least one zone of said semiconductor substrate;

depositing conductive material on said first protective layer and the exposed contact area of said at least one zone to provide a conductive layer on said first protective layer and said contact area of said at least one zone in overlying relation thereto;

Forming a first etching-protective mask on said conductive layer covering only the portions of said conductive layer from which a contact bridge and an associated connecting end are to be formed and the portion of said conductive layer overlying said contact area of said at least one zone;

performing a first plasma etching procedure to selectively remove the exposed portions of said conductive layer, thereby defining a patterned conductive layer having a contact bridge and an associated connecting end formed thereon and including a portion overlying said contact area of said at least one zone;

forming a second etching-protective mask on the patterned conductive layer covering only the region of said patterned conductive layer forming the contact bridge;

depositing metallic material on the structure including the second etching-protective mask and the exposed portions of the patterned conductive layer to provide at least one metallic layer thereover; and

performing a second plasma etching procedure to selectively remove portions of said metallic layer on said patterned conductive layer while retaining portions of said metallic layer overlying said contact area of said at least one zone and the portion of said patterned conductive layer defining the connecting end associated with the contact bridge to provide a patterned metallic layer forming electrical contact members;

The second etching-protective mask shielding the region of said patterned conductive layer forming the contact bridge from etching during the second plasma etching procedure.

4,882,294

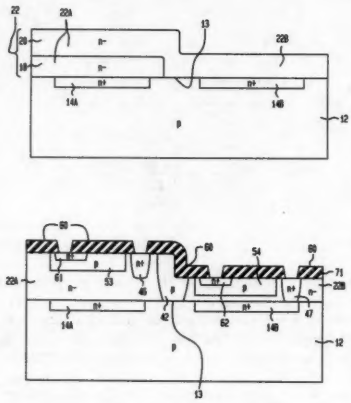
PROCESS FOR FORMING AN EPITAXIAL LAYER HAVING PORTIONS OF DIFFERENT THICKNESSES

John C. Christenson, Kokomo, Ind., assignor to Delco Electronics Corporation, Kokomo, Ind.

Filed Aug. 17, 1988, Ser. No. 233,319

Int. Cl.[4] H01L *21/00, 21/02, 21/72, 21/76*

U.S. Cl. 437—90 **23 Claims**



1. In the manufacture of an integrated circuit in a semiconductive wafer, the process of forming in the wafer an epitaxial layer having portions of at least two different thicknesses comprising the steps of:

preparing one surface of a monocrystalline semiconductive wafer for the growth thereon of epitaxial material;

forming over at least one region of said one surface of the wafer a sacrificial masking layer of a material that can serve as a barrier to the nucleation of epitaxial material thereover and that can be removed in situ, while leaving at least one other region of said one surface of the wafer free of the sacrificial masking layer;

heating the wafer in a furnace in which there is an ambient suitable for depositing the desired epitaxial material to a first thickness selectively over regions of the one surface free of the sacrificial masking layer;

treating the one surface of the wafer in situ in an ambient suitable for removing selectively the sacrificial masking layer at least at the other regions of the one surface for exposing the underlying regions of the one surface; and

heating the wafer in an ambient suitable for the deposition of epitaxial material both over the previously deposited epitaxial material and over the exposed regions of the one surface, thereby to form an epitaxial layer over said one surface having portions of different thickness.

4,882,295

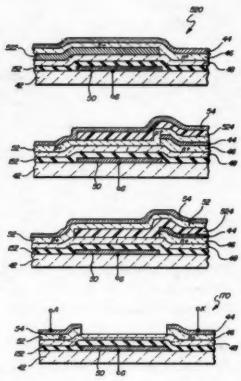
METHOD OF MAKING A DOUBLE INJECTION FIELD EFFECT TRANSISTOR

Wolodymyr Czubatyj, Warren; Michael G. Hack, Clawson, both of Mich., and Michael Shur, Golden Valley, Minn., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Division of Ser. No. 852,686, Apr. 16, 1986, which is a continuation-in-part of Ser. No. 788,594, Oct. 17, 1985, abandoned, which is a continuation-in-part of Ser. No. 759,634, Jul. 26, 1985, abandoned. This application Mar. 27, 1989, Ser. No. 328,666

Int. Cl.[4] H01L *29/78*

U.S. Cl. 437—101 **2 Claims**



1. A method of forming a thin film electronic device comprising the steps of:

forming a conductive gate on an insulating substrate;

forming an insulating layer over said gate;

depositing a layer of substantially intrinsic noncrystalline semiconductor material over said insulating layer;

forming a layer of etchable metal over said noncrystalline layer and patterning said metal, said metal being etchable by an etchant which does not readily adversely affect the electronic properties of said layer during etching;

depositing a first layer of doped noncrystalline semiconductor material over said patterned metal layer;

removing said metal layer by etching, and at the same time, removing that portion of said first doped layer which overlies said etchable metal layer.

4,882,296

HIGHLY BLOCKING THIN FILM DIODE HAVING A-SI:H FOR IMAGE SENSOR ROWS

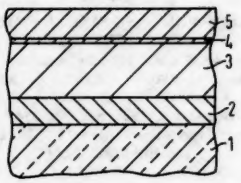
Martin Hoheisel; Gerhard Brunst, and Enno Holzenkaempfer, all of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich

Division of Ser. No. 890,113, Jul. 28, 1986, abandoned. This application Jun. 8, 1988, Ser. No. 204,962

Claims priority, application Fed. Rep. of Germany, Aug. 23, 1985, 3530235

Int. Cl.[4] H01L *31/10, 31/18*

U.S. Cl. 437—184 10 Claims



1. A method for manufacturing a highly blocking diode structure disposed on an insulating substrate comprising in sequence the steps of:

generating a metallic base electrode on said substrate;

generating a layer of undoped a-Si:H on said base electrode by glow-discharge deposition;

generating a barrier layer consisting of silicon oxide disposed on said a-Si:H layer by plasma oxidizing the exposed a-Si:H layer; and

generating a transparent surface electrode over said barrier layer and selecting the material for said transparent surface electrode from the group consisting of conductive oxides and metal silicides.

4,882,297

METHOD OF MAKING A SELF-ALIGNED SILICIDE CONTACT USING POLYSILICON ELECTRODE AS AN ETCH MASK

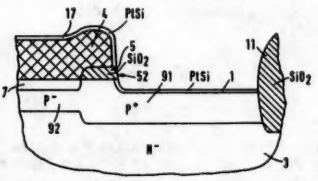
Lothar Blossfeld, Freiburg, Fed. Rep. of Germany, assignor to Deutsche ITT Industries GmbH, Freiburg, Fed. Rep. of Germany

Continuation of Ser. No. 905,757, Sep. 9, 1986, abandoned. This application Jun. 13, 1988, Ser. No. 205,589

Claims priority, application European Pat. Off., Sep. 21, 1985, 85111972.7

Int. Cl.[4] H01L *21/225, 21/283, 21/302*

U.S. Cl. 437—200 16 Claims



1. In an integrated solid-state circuit an improvement in a method of attaching a contact to a contact area of a first active region in a substrate of semiconducting material in close direct proximity of an electrode layer of polycrystalline silicon in contact with a second active region in said substrate without danger of shorting therebetween, said contact area to be defined through an insulting layer, said contact to be bonded to the substrate on a surface of said contact area, the electrode layer having an edge portion disposed at least partially on a narrow frame-shaped layer portion of an insulating material which is disposed in turn on said substrate, said improvement comprising the steps of:

using said electrode layer for laterally delimiting an etching process to selectively expose at least one part of a vertical rim portion of the insulating frame-shaped layer portion and an adjoining contact area of the substrate, said frame-shaped layer portion having a predetermined thickness which defines said close direct proximity between said electrode layer and said contact area;

depositing a metal layer of a metal forming a metallic silicide onto all exposed surfaces, said metal layer having a thickness which is less than the predetermined thickness of said frame-shaped layer portion;

heating the metal layer with the underlying silicon of the electrode layer and of the substrate to form the metallic silicide in said contact areas and on said electrode layer, without chemically reacting with the insulating material including said insulating frame layer portion; and

removing the metal layer which has not reacted with the silicon with the aid of an etching agent which selectively dissolves the metal layer,

whereby said electrode layer and contact may be closely positioned on said substrate with a low capacitance therebetween without danger of being shortd together.

4,882,298

METHOD FOR ENCAPSULATING MICROELECTRONIC SEMICONDUCTOR AND THIN FILM DEVICES

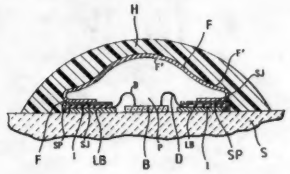
Werner Moeller, Ulm, and Andreas Ulmann, Lenningen, both of Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany

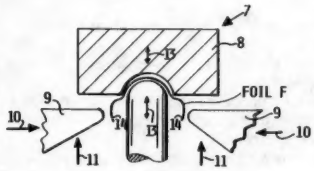
Filed Jul. 29, 1988, Ser. No. 226,426

Claims priority, application Fed. Rep. of Germany, Jul. 30, 1987, 3725269

Int. Cl.[4] H01L *21/60*

U.S. Cl. 437—212 17 Claims





1. A method for encapsulating a microelectronic semiconductor device comprising the following steps:

(a) securing said semiconductor device on a substrate,

(b) electrically connecting said semiconductor device through bonded wires (D) to conducting strips (LB) on said substrate

(c) applying an insulating collar (I) on said conducting strips (LB) to cover said conducting strips at least in an area to be encapsulated,

(d) applying a soldering binder layer (SP) about 50 to 150 μm thick to cover said insulating collar (I),

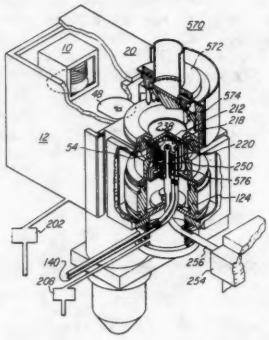
(e) coating a metal foil (F) on at least one side with an insulating coating (F'),
(f) cutting a capsule blank from said coated metal foil with a shape and size appropriate for said area to be encapsulated,
(g) forming said capsule blank into a domed capsule, said forming providing said domed capsule with a beaded soldering flange (14).
(h) placing said domed capsule over said semiconductor component at said area to be encapsulated, so that said beaded soldering flange contacts said soldering binder layer (SP), and
(i) stamp soldering said soldering flange by applying a pressure within the range of about 1 to 5 bar at a temperature within the range of about 220° C. to about 280° C. for forming a hermetic seal between said soldering binder layer (SP) and said soldering flange of said domed capsule.

4,882,299

DEPOSITION OF POLYSILICON USING A REMOTE PLASMA AND IN SITU GENERATION OF UV LIGHT.

Dean W. Freeman, San Diego, Calif., and James B. Burris, Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation-in-part of Ser. No. 74,373, Jul. 16, 1987, abandoned. This application Nov. 5, 1987, Ser. No. 117,707
Int. Cl.[4] H01L *21/302, 21/306*
U.S. Cl. 437—233 **14 Claims**



1. A method for depositing polysilicon on a wafer comprising;
(a) disposing a wafer into a process chamber of a process module;
(b) purging the process vacuum process chamber with an appropriate gas;
(c) applying a pressure to said chamber less than ambient to maintain said chamber at less than ambient;
(d) heating the chamber;
(e) generating a remote plasma from a silicon containing and a dopant gas;
(f) presenting said remote plasma to a face of said wafer in said chamber;
(g) providing a separate flow, within said chamber, of a gas suitable for the production of ultraviolet light;
(h) generating an RF power discharge within said separate flow to release ultraviolet energy; and
(i) illuminating said face of said wafer with said ultraviolet energy generated inside said module.

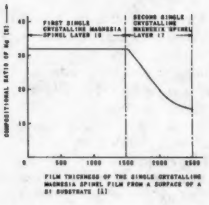
8. A method for depositing polysilicon on a wafer, comprising the steps of:
(a) generating free radicals from a silicon containing gas and a dopant gas in a plasma generating chamber remote from the process chamber;
(b) introducing the free radicals to a face of the wafer in the process chamber;
(c) providing a separate flow, within said process chamber, of a gas suitable for the production of ultraviolet light;
(d) generating an RF power discharge within said separate flow to release ultraviolet energy; and
(e) illuminating the face of the wafer with ultraviolet energy which is generated inside the module.

4,882,300

METHOD OF FORMING SINGLE CRYSTALLINE MAGNESIA SPINEL FILM

Yasunori Inoue, Osaka, and Hiroshi Hanafusa, Hirakata, both of Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan

Filed Oct. 6, 1988, Ser. No. 254,430
Claims priority, application Japan, Oct. 12, 1987, 62-254615
Int. Cl.[4] H01L *21/31*
U.S. Cl. 437—236 **10 Claims**



1. A method of forming a single crystalline magnesia spinel film on a single crystalline silicon substrate by the vapor-phase epitaxial growth method comprising;
epitaxially growing in a vapor-phase a first single crystalline magnesia spinel layer having a compositional ratio of magnesium being maintained at a nearly stoichiometric ratio on said single crystalline silicon substrate; and
epitaxially growing in a vapor-phase a second single crystalline magnesia spinel layer having a compositional ratio of magnesium which decreases from the stoichiometric compositional ratio according as being apart from said first single crystalline magnesia spinel layer on said first single crystalline magnesia spinel layer, and said single crystalline magnesia spinel film is made of said first single crystalline magnesia spinel layer and said second single crystalline magnesia spinel layer.

4,882,301

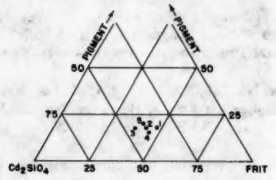
DECORATIVE AND PROTECTIVE BORDERS FOR AUTOMOBILE SIDE AND REAR LIGHTS

James R. Gettys, Mars, Pa.; Gordon H. Johnson, Olmsted Falls, Ohio; Temel Demiray, Hinckley, Ohio, and William D. Faust, Aurora, Ohio, assignors to Ferro Corporation, Cleveland, Ohio

Continuation of Ser. No. 785,809, Oct. 9, 1985, abandoned. This application Feb. 2, 1988, Ser. No. 157,069
Int. Cl.[4] C03C *8/14, 8/16, 14/00*
U.S. Cl. 501—17 **6 Claims**

1. A glass enamel system, the glass fraction of which is a lead borosilicate glass, wherein said system is adaptable to be fired and fused to a glass enamel on a glass substrate at from about

1000° F. to about 1350° F., comprising a crystallizing amount dispersed in said system of the precursors of the crystal



Cd_2SiO_4 in sufficient quantities to provide from about 25 to about 50 weight percent Cd_2SiO_4 in the resulting, fired enamel.

4,882,302

LATHANIDE SERIES OXIDE MODIFIED ALKALINE-RESISTANT GLASS

Tetsuro Horiuchi, Gardena; Arnold E. Goldman, Canoga Park, both of Calif., and Durai N. Raghavan, Plano, Tex., assignors to Ensci, Inc., Woodland Hills, Calif.

Continuation of Ser. No. 937,376, Dec. 3, 1986, abandoned, which is a continuation-in-part of Ser. No. 702,971, Feb. 19, 1985, abandoned. This application May 19, 1988, Ser. No. 203,518

Int. Cl.[4] C03C *6/02, 13/00;* **C04B** *14/42*

U.S. Cl. 501—27 **23 Claims**

1. A glass composition comprising alkaline resistant glass fibers comprising: alumina in an amount of about 15.1% or less by weight, silica —about 30% to about 70% by weight, calcia —about 23% to about 60% by weight, magnesia —0% to less than about 6% by weight, at least one lanthanide series metal oxide —about 0.1% to about 20% by weight effective to enhance the alkali resistance of said glass fibers, zirconia plus thoria —0% to about 3% by weight, and alkali metal oxide —0% to less than about 3% by weight.

4,882,303

MODIFIED STEEL SLAG AND METHOD OF MANUFACTURING THE SAME

Kozo Sonobe; Takashi Fukuzawa; Kohsuke Takeuchi; Tatushi Tabata, all of Koriyama; Hiroshi Fukuoka; Kunio Hisamatsu, both of Tokyo, and Makoto Katamura, Kure, all of Japan, assignors to Nippon Chemical Industrial Co., Ltd., Japan

Filed Aug. 1, 1988, Ser. No. 226,628

Claims priority, application Japan, Aug. 4, 1987, 62-193719

Int. Cl.[4] C03C *3/089;* **C21B** *5/04*

U.S. Cl. 501—28 **8 Claims**

1. A modified steel slag or iron slag comprising slag which is a by-product at the time of steel or iron metallurgy, said slag containing from 0.3 to 1.5 wt% boron component in the form of B_2O_3 and having resistance against degradation in a cooling-down process for fused slag and against generation of yellowish turbid water at the time of contact of said slag with rain water.

4. A method of manufacturing modified steel slag or iron slag comprising adding at least 10 wt% of a heat-treated material containing boron in the form of sintered or vitrified B_2O_3 to fused slag which is a by-product created at the time of steel or iron metallurgy during operation of blast furnaces, converters or steel furnaces, and then cooling said slag.

4,882,304

LIQUIFICATION OF HIGHLY LOADED COMPOSITE SYSTEMS

Bruce E. Novich, Lexington, and John W. Halloran, Hopkinton, both of Mass., assignors to Ceramics Process Systems Corp., Milford, Mass.

Continuation-in-part of Ser. No. 856,803, Apr. 25, 1986, Pat. No. 4,816,182. This application Apr. 9, 1987, Ser. No. 36,377

Int. Cl.[4] B01F *3/12, 17/00;* **B22F** *3/22;* **C04B** *33/28*

U.S. Cl. 501—32 **26 Claims**

1. A process for the production of a densified article from a highly loaded, pourable composite suspension, the suspension provided by a process comprising:

(a) mixing solid, essentially colloidal, narrow size range matrix particles selected from the group consisting of ceramics and metals with water and an acrylic acid-based polymeric electrolyte dispersant to provide a colloidal suspension; and

(b) admixing solid dopant particles to the colloidal suspension of matrix particles to produce a high loaded pourable composite system, the dopant particles being geometrically and/or chemically diverse from the matrix particles, the total solids present in the system in an amount of at least 50% by volume.

4,882,305

DIELECTRIC CERAMIC COMPOSITION WITH HIGH DIELECTRIC CONSTANT AND FLAT TC CHARACTERISTICS

Mike S. H. Chu; Charles E. Hodgkins, both of Lewiston, and Terence C. Dean, Youngstown, all of N.Y., assignors to TAM Ceramics, Inc., Niagara Falls, N.Y.

Continuation of Ser. No. 730,711, May 3, 1985, abandoned. This application Oct. 9, 1987, Ser. No. 106,954

Int. Cl.[4] C04B *35/46, 35/48, 35/49*

U.S. Cl. 501—138 **6 Claims**

1. A ceramic composition having a dielectric constant between about 3,000 and 4,700 at 25° C. consisting of

about 97.7–98.99% wt barium titanate;

about 0.85–1.69% wt of niobium pentoxide;

about 0.09–1.20% of cobalt oxide;

about a wt ratio of niobium pentoxide to cobalt oxide of about 3.30 to 18.00 and wherein

the barium titanate has a purity of about 99.0%, a BaO/TiO_2 stoichiometric ratio of about 0.950 to 0.995; and an average particle size of about 0.90 μm to 1.30 μm;

the niobium pentoxide has a purity of about 99.0% and a particle size of about 0.5 to 0.9 μm; and

the cobalt oxide has a purity of about 70% to 74% and a particle size of less than about 1.0 μm.

4,882,306

METHOD FOR PRODUCING SELF-SUPPORTING CERAMIC BODIES WITH GRADED PROPERTIES

Christopher R. Kennedy; Andrew W. Urquhart, both of Newark; Danny R. White, New Castle, and Marc S. Newkirk, Newark, all of Del., assignors to Lanxide Technology Company, LP, Newark, Del.

Filed Sep. 16, 1988, Ser. No. 907,928

Int. Cl.[4] C04B *35/02*

U.S. Cl. 501—87 **14 Claims**

1. A method for producing a self-supporting ceramic body by oxidation of a parent metal, said ceramic body having a graded microstructure characterized by a plurality of zones differing from each other in at least one property, which method comprises the steps of:

(a) heating said parent metal in the presence of a vapor-phase oxidant to a temperature range above the melting point of the parent metal but below the melting point of any resulting oxidation reaction product of the parent metal and the vapor-phase oxidant, to form a body of molten parent metal and reacting said molten parent metal with said

vapor-phase oxidant at said temperature range to said oxidation reaction product, which product is in contact with and extends between said body of molten metal and said vapor-phase oxidant;

(b) at said temperature, transporting said molten metal through said oxidation reaction product towards said vapor-phase oxidant so that fresh oxidation reaction product forms at an interface between said vapor-phase oxidant and previously formed oxidation reaction product thereby forming a progressively thicker first portion of said oxidation reaction product;

(c) altering at least one process condition during formation of said first portion of said oxidation reaction product such that at least a second portion of oxidation reaction product formed posterior to said altering has at least one property different from said first portion of oxidation reaction product formed anterior to said altering:

(d) continuing said reaction for a time sufficient to produce said first portion and said at least a second portion of said oxidation reaction product to form said ceramic body; and

(e) recovering said ceramic body.

4,882,307

PROCESS FOR PREPARING NOBLE METAL-CONTAINING ZEOLITES

Ying-Yen P. Tsao, Lahaska, Pa., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Sep. 2, 1987, Ser. No. 92,248

Int. Cl.[4] B01J *29/12, 29/32*

U.S. Cl. 502—66 **19 Claims**

1. A process for preparing noble metal-containing zeolite material of enhanced noble metal dispersion which comprises:

(a) contacting a zeolite material with a cationic noble metal complex;

(b) calcining the resulting material in the presence of molecular oxygen at about 300° to 375° C. for a period of time sufficient to cause decomposition of the noble metal complex into a product containing cationic noble metal species;

(c) purging oxygen and water from the resulting material by exposing said material to an atmosphere of inert gas at 200° to 350° C. and

(d) reducing the resulting material with hydrogen at 200° to 350° C. for a period of time sufficient to reduce said cationic noble metal species to highly dispersed free metal.

3. The process of claim 1 wherein said zeolite is selected from the group consisting of zeolite beta, ZSM-5, ZSM-11, ZSM-12, ZSM-18, ZSM-20, ZSM-22, ZSM-23, ZSM-35 and ZSM-48.

6. The process of claim 1 wherein the noble metal is selected from the group consisting of platinum, palladium, rhodium, ruthenium, silver, rhenium, and iridium.

8. The process of claim 1 wherein said zeolite material comprises a binder selected from the group consisting of silica-alumina, silica, and alumina.

4,882,309

LIGNOSULFONATE-MODIFIED CALCIUM HYDROXIDE FOR SO2 CONTROL DURING FURNACE INJECTION

David A. Kirchgessner, Chapel Hill, and Jeffrey M. Lorrain, Raleigh, both of N.C., assignors to United States of America Environmental Protection Agency, Research Triangle Park, N.C.

Division of Ser. No. 930,689, Nov. 12, 1986, Pat. No. 4,786,485. This application Aug. 9, 1988, Ser. No. 230,585

Int. Cl.[4] B01J *20/22, 20/28*

U.S. Cl. 502—401 **6 Claims**

1. A method for preparing particulate calcium hydroxide/-calcium lignosulfonate sorbent comprising the steps of contacting calcium oxide with water at a water to calcium oxide ratio of 2.6 with said water containing a sufficient amount of calcium lignosulfonate to result in the crystallization of calcium hydroxide/calcium lignosulfonate particles containing up to 5% by weight calcium lignosulfonate.

4,882,310

HEAT-SENSITIVE RECORDING MATERIAL WITH HEAT-SENSITIVE COLOR DEVELOPING LAYER CONTAINING PRISMATIC CALCIUM CARBONATE

Naoto Arai, Ikeda; Masaharu Nojima, Amagasaki, and Ritsuo Mandoh, Sakai, all of Japan, assignors to Kanzaki Paper Manufacturing Co., Ltd., Tokyo, Japan

Filed Oct. 5, 1988, Ser. No. 253,862

Claims priority, application Japan, Oct. 8, 1987, 62-255097

Int. Cl.[4] B41M *5/18*

U.S. Cl. 503—207 **5 Claims**

1. An improved heat-sensitive recording material of the type having a substrate and a heat-sensitive recording layer formed thereon which contains a colorless or light-colored basic dye and a color developer to color said basic dye upon contact by heating, characterized in that the heat-sensitive recording layer is formed by applying a coating dispersion containing prismatic calcium carbonate comprising single particles each having such a particle size that the average length is 1 to 6 μm and the average breadth is 0.1 to 0.6 μm.

4,882,311

HEAT-SENSITIVE RECORDING MATERIAL

Kenji Ikeda; Ken Iwakura, and Masanobu Takashima, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

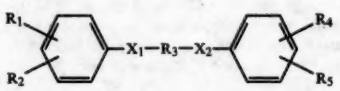
Filed Feb. 6, 1987, Ser. No. 11,806

Claims priority, application Japan, Feb. 6, 1986, 61-24493

Int. Cl.[4] B41M *5/18*

U.S. Cl. 503—208 **5 Claims**

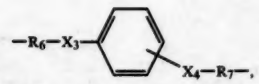
1. A heat-sensitive recording material comprising a support having provided thereon a heat-sensitive color forming layer containing an electron donating dye precursor and an electron accepting compound, said heat-sensitive color forming layer containing (1) at least one compound selected from the group consisting of an (a) aromatic polyether and (b) aromatic polyester, and (2) an aromatic ether, wherein said aromatic ether is other than said aromatic polyether, wherein said aromatic polyether and aromatic polyester is selected from the group consisting of compounds represented by formula (I):



(I)

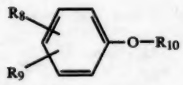
wherein R_1, R_2, R_4 and R_5 may be the same or different, and each represents hydrogen, alkyl, alkoxy, aryloxy, acyl, halogen, cyano, aryl alkyloxycarbonyl or aryloxycarbonyl, wherein the pair R_1 and R_2 and the pair R_4 and R_5 may each combine and form a ring structure.

R_3 represents an alkylene group having 1 to 5 ether bonds or ester bonds and having from 1 to 10 carbon atoms, or represents



wherein R_6 and R_7 each represents an alkylene group having from 1 to 8 carbon atoms, X_3 and X_4 each represents -O-, or -S-, and X_1 and X_2 may be the same or different and each represents -O-, -S- or

and wherein said aromatic ether is an aromatic monoether represented by formula (II)



(II)

wherein R_8 and R_9 are each defined the same as R_1 above, wherein R_8 and R_9 can combine to form a ring structure, and R_{10} represents a substituted or unsubstituted alkyl, substituted or unsubstituted aralkyl, or substituted or unsubstituted aryl.

4,882,312

EVAPORATION OF HIGH TC Y-BA-CU-O SUPERCONDUCTING THIN FILM ON SI AND SIO_2 WITH A ZIRCONIA BUFFER LAYER

Antonio Mogro-Campero, and Larry G. Turner, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed May 9, 1988, Ser. No. 192,039

Int. Cl.[4] B05D *5/12;* **C23C** *14/08, 14/24*

U.S. Cl. 505—1 **31 Claims**

11. A process for producing a composite consisting essentially of a substrate, a zirconium dioxide film and a superconductive film having a composition represented by the formula $YBa_xCu_yO_z$ where x ranges from about 1.7 to about 2.3, where y ranges from about 2.7 to about 3.3 and where z ranges from about 6.5 to about 7.0, said superconductive film having a zero resistance transition temperature of at least about 38 K, which consists essentially of providing a substrate selected from the group consisting of elemental silicon, oxidized elemental silicon, silicon dioxide and aluminum oxide, depositing a microscopically pore-free film ranging in thickness from about 2000 Angstroms to about 4000 Angstroms of zirconium dioxide on the substrate in a partial vacuum, heating the resulting film-carrying substrate in a partial vacuum to an annealing temperature ranging from about 450° C. to about 850° C, depositing by evaporation on the zirconium dioxide film Y, Ba, Cu and O in amounts required for the superconductive film, said heating being sufficient to produce the orthorhombic crystal structure in an amount sufficient to produce the superconductive film, and cooling the resulting structure in oxygen at about atmospheric pressure at a rate of less than about 5° C. per minute which produces the superconductive film, said zirconium dioxide film having a thickness at least sufficient to prevent interdiffusion between said precursor film and substrate during said heating, said superconductive film having a thickness ranging from about 0.3 micron to about 1 micron.

4,882,313

CARBOXAMIDE DERIVATIVES OF GLYCOPEPTIDES

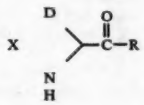
Robert D. Sitrin, Lafayette Hill, Pa., assignor to SmithKline Beckman Corporation, Philadelphia, Pa.

Filed Jul. 31, 1987, Ser. No. 80,025

Int. Cl.[4] A61K *7/02;* **C07K** *9/00, 7/50*

U.S. Cl. 514—8 **18 Claims**

1. A compound of the formula:



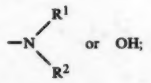
wherein

X is the remaining portion of an Ardacin glcopeptide antibiotic or a hydrolysis product, N-acyl or glycosylated derivative thereof;

(D) is the D ring of Ardacin

R is NH_2 or $NH(CH_2)_nY$;

Y is



R^1 and R^2 are independently hydrogen or C_1–C_3 alkyl;

n is 0 to 6;

and wherein the free carboxyl group of any sugar which is attached to the glycopeptide antiobitic may also be substituted by R as defined above; or a pharmaceutically acceptable salt thereof.

4,882,314

A COMPOSITION AND METHOD OF TREATING SELECTED MALIGNANT CONDITIONS

Setsuo Takeuchi, Higashiyamato; Mutsuyuki Kochi, No. 19 Matsudashinden, Matsudo-shi, Chiba-ken; Akira Kawarada, Tokyo; Shinichiro Esumi, Kunitachi; Kaguya Sasaki, Higashikurume; Shozo Kawabata, Kawagoe; Tsuneo Saita; Yukio Inoue, both of Tokyo; Makoto Yamamoto, Tokyo, and Keiji Sekine, Yono, all of Japan, assignors to Rikagaku Kenkyusho, Wako; Mutsuyuki Kochi, Matsudshi and Kaken Kagaku Kabushiki Kaisha, Tokyo, all of, Japan

Continuation of Ser. No. 803,412, Dec. 2, 1985, abandoned, which is a continuation of Ser. No. 567,961, Jan. 4, 1984, abandoned, which is a continuation of Ser. No. 424,401, Sep. 27, 1982, abandoned, which is a continuation of Ser. No. 275,369, Jun. 19, 1981, abandoned, which is a continuation of Ser. No. 155,401, Jun. 2, 1980, abandoned. This application Aug. 4, 1987, Ser. No. 81,480

Int. Cl.[4] A61K *31/70*

U.S. Cl. 514—23 **7 Claims**

7. A method of causing at least temporary relief to humans and animals suffering from a malignant condition which is carcinoma of the colon, cancer of the stomach, cancer of the tongue, peritonitis carcinomatosa, cancer of the liver or malignancies induced by SV_{40} virus, which consists of administering to said humans and animals an amount effective to cause regression of the carcinoma of a composition comprising 4,6-O-benzylidene-D-glucopyranose as the active ingredient in the form of an enteric tablet or enteric granule or a capsule containing a dosage of about 1.5 to about 15000 mg per day of 4,6-O-benzylidene-D-glucopyranose.

4,882,315

AMINOGLYCOSIDE STEROIDS, A PROCESS FOR THEIR PREPARATION, THEIR USE AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Laura Chiodini, Busto Arsizio; Mauro Gobbini, Sesto Calende; Sergio Mantegani, Milan; Daniel Ruggieri, Milan; Aldemio Temperilli, Milan; Gabriella Traquandi, Cornate d'Adda, and Patrizia Ferrari, Varese, all of Italy, assignors to Farmitalia Carlo Erba S.p.A., Milan, Italy

PCT No. PCT/EP87/00004, § 371 Date Oct. 29, 1987, § 102(e) Date Oct. 29, 1987, PCT Pub. No. WO87/04167, PCT Pub. Date Jul. 16, 1987

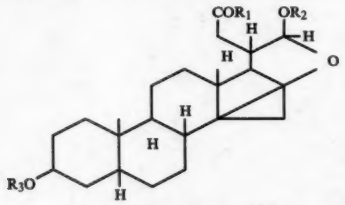
PCT Filed Jan. 7, 1987, Ser. No. 133,035

Claims priority, application United Kingdom, Jan. 9, 1986, 8600489

Int. Cl.[4] A61K *31/58*

U.S. Cl. 514—26 **7 Claims**

1. A compound having the general formula I



I

wherein either R_1 represents a hydroxy group or an alkoxy group having from 1 to 4 carbon atoms and R_2 represents a hydrogen atom or an alkyl group having from 1 to 4 carbon atoms, or R_1 and R_2 taken together represent a chemical bond; and R_3 represents an aminodeoxy or aminodideoxy or aminotrideoxy sugar residue of the D or L series, or a pharmaceutically acceptable salt thereof.

4,882,316

PYRIMIDINE DERIVATIVES

Robert W. Lambert, Welwyn; Joseph A. Martin, Harpenden, and Gareth J. Thomas, Welwyn, all of England, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

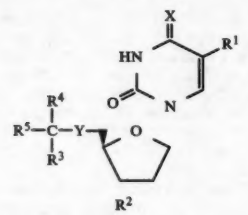
Filed Jul. 30, 1987, Ser. No. 79,741

Claims priority, application United Kingdom, Aug. 8, 1986, 8619424; May 7, 1987, 8710777

Int. Cl.[4] A61K *31/70;* **C07H** *19/07;* **C07D** *405/04, 403/00*

U.S. Cl. 514—49 **15 Claims**

1. A compound of the formula



I

wherein R^1 is halogen, C_{1-4}-alkyl or halo-(C_{1-4}-alkyl), R^2 is hydrogen, hydroxy or cyclopentylpropionyloxy, phenylacetoxy, benzoyloxy or C_{1-4}-alkanoyloxy R^3 and R^4 each are hydrogen or C_{1-4}-alkyl, R^5 is unsubstituted phenyl or phenyl carrying one or more substituents selected from the group consisting of halogen, hydroxy, C_{1-4}-alkyl, C_{1-4}-alkoxy, trifluoromethyl, nitro and phenyl; or unsubstituted phenyloxy or phenyloxy carrying one or more substituents selected from the group consisting of halogen, hydroxy, C_{1-4}-alkyl, C_{1-4}-alkoxy, trifluoromethyl, nitro, and phenyl, X is O or NH and Y is —CO—CH_2—, —CH(OH)—CH_2—, —CH_2—CH_2—, —SO— or —SO_2—,

or a tautomer thereof.

4,882,317

COVALENTLY-MODIFIED BACTERIAL POLYSACCHARIDES, STABLE COVALENT CONJUGATES OF SUCH POLYSACCHARIDES AND IMMUNOGENIC PROTEINS WITH BIGENERIC SPACERS AND METHODS OF PREPARING SUCH POLYSACCHARIDES AND CONJUGATAES AND OF CONFIRMING COVALENCY

Stephen Marburg, Metuchen, N.J.; Peter J. Kniskern, Lansdale, Pa., and Richard L. Tolman, Warren, N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 719,678, Apr. 4, 1985, Pat. No. 4,695,624, which is a continuation-in-part of Ser. No. 608,738, May 10, 1984, abandoned. This application Jun. 18, 1987, Ser. No. 63,607

Int. Cl.[4] A61K *37/02, 39/02;* **C07K** *15/04*

U.S. Cl. 514—54 **17 Claims**

1. A process for solubilizing polyanionic polysaccharides having acid groups comprising

(a) replacing the acid hydrogens of the polysaccharide with large hydrophobic cations selected from the group consisting of tri or tetra (C_1–C_5) alkylammonium, 1-azabicyclo [2.2.2.]octane and 11,8-diazabicyclo undec-7-ene, thereby creating the salt form of the polysaccharide, then

(b) dissolving the salt form of the polysaccharide in a non-aqueous, polar, aprotic solvent.

4. A process for covalently-modifying a polyanionic polysaccharide to form a modified polysaccharide capable of covalent bonding to a functionalized protein comprising

(a) solubilizing the polysaccharide in a non-aqueous, polar, aprotic solvent;

(b) activating the polysaccharide with a bifunctional reagent; then

(c) reacting this activated polysaccharide with a bis-nucleophile.

4,882,318

METHOD FOR DECREASING TUMOR METASTASIS

Israel Vlodavsky; Amiram Eldor; Yaakov Naparstek, all of Jerusalem, and Irun R. Cohen, Reheovot, all of Israel, assignors to Hadassa Medical Organization, Jerusalem and Yeda Research and Development Company Limited, Rehovot, both of, Israel

Filed Jun. 24, 1987, Ser. No. 67,582

Claims priority, application Israel, Jun. 26, 1986, 79255

Int. Cl.[4] A61K *31/725;* **C08B** *37/10*

U.S. Cl. 514—56 **3 Claims**

1. A method for decreasing tumor metastasis in a mammal comprising the step of administering intact heparin or N-desulfated, N-deacetylated heparin at a dosage of about 0.05 mg/kg/day–0.5 mg/kg/day to a mammal having a malignant tumor.

4,882,319

PHOSPHONIC ACID SUBSTITUTED AROMATIC STEROIDS AS INHIBITORS OF STEROID 5-α-REDUCTASE

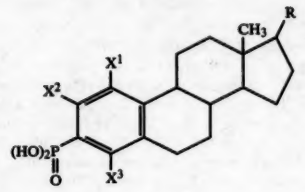
Dennis A. Holt, Downingtown; Mark A. Levy, Wayne, and Brian W. Metcalf, Radnor, all of Pa., assignors to SmithKline Beckman Corporation, Philadelphia, Pa.

Filed Dec. 23, 1988, Ser. No. 290,056

Int. Cl.[4] A61K *31/66, 31/665, 31/675;* **C07J** *1/00*

U.S. Cl. 514—119 **24 Claims**

1. A compound represented by the formula:



(I)

in which:

the B, C, and D rings have optional double bonds where indicated by the broken lines, provided that the C ring does not have a double bond when the B ring has a C_8–C_9 double bond, and provided that the D ring does not have a C_{16}–C_{17} double bond when R represents two substituents or a divalent substituent;

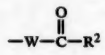
X^1, X^2, and X^3 are any accessible combination of H, Cl, F, Br, I, CF_3, or $C_{1\text{-}6}$alkyl, OH, $C_{1\text{-}6}$alkoxy, CN, NO_2, $N(R^1)_2$, CHO, or CO_2R^1;

R^1 each independently is H or $C_{1\text{-}8}$alkyl; and

R is

(1) α-hydrogen, α-hydroxyl, or α-acetoxy and/or

(a)



where W is a bond or $C_{1\text{-}12}$alkyl, and R^2 is

(i) hydrogen,

(ii) hydroxyl,

(iii) $C_{1\text{-}8}$alkyl,

(iv) hydroxy $C_{1\text{-}8}$alkyl,

(v) $C_{1\text{-}18}$alkoxy,

(vi) $N(R^3)_2$, where each R^3 is independently selected from hydrogen, $C_{1\text{-}8}$alkyl, $C_{3\text{-}6}$cycloalkyl, phenyl; or both R^3 taken together with the nitrogen to which they are attached represent a 5–6 member saturated ring comprising up to one other heteroatom selected from oxygen and nitrogen, or

(vii) OR^4, where R^4 is alkali metal or benzyl, or

(b) —Alk—OR^5, where Alk is $C_{1\text{-}12}$alkyl, and R^5 is

(i) phenyl $C_{1\text{-}6}$alkylcarbonyl,

(ii) $C_{5\text{-}10}$cycloalkylcarbonyl,

(iii) benzoyl,

(iv) $C_{1\text{-}8}$alkoxycarbonyl,

(v) aminocarbonyl or $C_{1\text{-}8}$alkyl substituted aminocarbonyl, or

(vi) $C_{1\text{-}8}$alkyl,

(2) =CH—W—CO—R^2 or =H—W—OR^5, where W is a bond or $C_{1\text{-}12}$alkyl and R^2 and R^5 have the same meaning as above and R^5 also is $C_{1\text{-}20}$alkylcarbonyl;

(3)

where the dashed bond replaces the 17-α-hydrogen,

(4) α-hydrogen and β-NHCOR^6 where R^6 is $C_{1\text{-}12}$alkyl or β-$N(R^3)_2$ where R^3 has the same meaning as above,

(5) α-hydrogen and β-cyano,

(6) α-hydrogen and β-tetrazolyl, or

(7) keto:

or a pharmaceutically acceptable salt thereof.

4,882,320

PESTICIDAL PYRIMIDINYL (THIONO)(THIO)-PHOSPHATES

Fritz Maurer, Wuppertal; Benedikt Becker, Mettmann, and Bernhard Homeyer, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

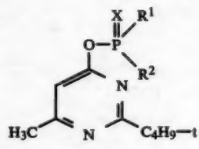
Filed Aug. 26, 1988, Ser. No. 237,242

Claims priority, application Fed. Rep. of Germany, Sep. 2, 1987, 3729264

Int. Cl.^{4} A01N *57/16*; C07F *9/65*

U.S. Cl. 514—86 **12 Claims**

1. A pyrimidinyl(thiono)(thio)-phosphate of the formula



(I)

in which

R^1 stands for C_1–C_4 alkoxy,

R^2 stands for alkoxy or C_1–C_4 alkylthio and

X stands for oxygen or sulphur,

with the proviso that the two radicals R^1 *II and R2* are identical when they stand for alkoxy.

10. An insecticidal, acaricidal or nematocidal composition comprising an insecticidally, acaricidally or nematicidally effective amount of a compound according to claim and a diluent.

11. A method of combating insects, acarids or nematodes which comprises applying to such insects, acarids, nematodes or habitat thereof an insecticidally, acaricidally or nematicidally effective amount of a compound according to claim **1**.

4,882,321

THIONOPHOSPHONIC ACID ESTER ARTHROPODICIDES

Fritz Maurer, Wuppertal; Herbert Sommer, Remscheid; Wolfgang Behrenz, Overath; Bernhard Homeyer, Leverkusen, and Wilhelm Stendel, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

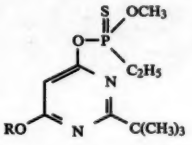
Filed Feb. 5, 1988, Ser. No. 152,521

Claims priority, application Fed. Rep. of Germany, Feb. 14, 1987, 3704689

Int. Cl.^{4} A01N *57/24*; C07F *9/65*

U.S. Cl. 514—86 **8 Claims**

1. An O-(6-alkoxy-2-tert-butyl-pyrimidin-4-yl)-O-methylthionoethanephosphonic acid diester of the formula



in which

R represents alkyl with 1 to 4 carbon atoms or cycloalkyl with 3 or 4 carbon atoms.

5. An arthropodicidal composition comprising an arthropodicidally effective amount of a compound according to claim **1** and a diluent.

6. A method of combating arthropods which comprises applying to such arthropods or to an arthropod habitat an arthropodicidally effective amount of a compound according to claim **1**.

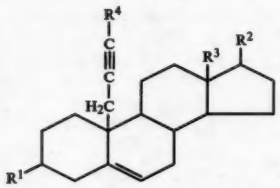
4,882,322

3β,17β-HYDROXY-SUBSTITUTED STEROIDS AND RELATED STEROIDAL COMPOUNDS

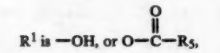
J. O'Neal Johnston, Milford, and Gene W. Holbert, Loveland, both of Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

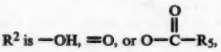
Filed Oct. 27, 1988, Ser. No. 263,091
Int. Cl.[4] A61K *31/56;* C07J *1/00*
U.S. Cl. 514—178 12 Claims

1. A compound having the following formula:



wherein:





R^3 is $-CH_3$, or $-CH_2CH_3$,
R^4 is —H, or C_{1-4} alkyl, and
R^5 is C_{1-10} alkyl.

4,882,323

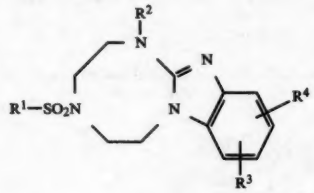
1,2,3,4,5,6-HEXAHYDRO[1,3,6]TRIAZOCINO[1,1-A]BENZIMIDAZOLES

Michael W. Winkley, Malvern, and James L. Diebold, Norristown, both of Pa., assignors to American Home Products, New York, N.Y.

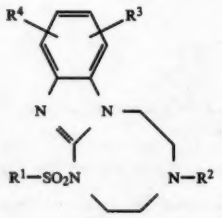
Filed Feb. 23, 1988, Ser. No. 159,623
Int. Cl.[4] C07D *487/04;* A61K *31/395*
U.S. Cl. 514—183 25 Claims

14. A compound of formula I or II

Formula I



Formula II



wherein

R^1 is phenyl, m- or p-nitrophenyl, m- or p-methylsulfonylaminophenyl,naphthyl, naphthyl mono-substituted by nitro or methylsulfonylamino, benzofurazanyl, 2-pyrimidinyl, 2- or 4-pyridinyl, 2- or 4-naphthridinyl, pyrazinyl, isoquinolinyl, or quinolinyl;

R^2 is hydrogen, C_1–C_8 alkyl, phenyl(C_1–C_4)-alkyl, substituted-phenyl(C_1–C_4)alkyl in which phenyl may have one to three substituents selectd from C_1–C_4 alkyl, C_1-alkoxy, fluorine, chlorine, or bromine, 2- or 4-pyrimidinyl, pyrazinyl, halo- or dihalo-(C_1–C_4)alkanoyl in which halo is fluoro or chloro, benzoyl substituted on the phenyl ring by one or two C_1–C_4 alkyl groups, C_1–C_4 alkylmino(C_1–C_4)alkanoyl, phenyloxy or naphthyloxy(C_1–C_4)alkyl, C_1–C_4 alkylsulfonyl, N-(C_1–C_4)alkyl or N-di-(C_1–C_4alkyl)carboxamido(C_1–C_4)alkyl, N-phenyl or substituted-phenylcarboxamido(C_1–C_4)alkyl in which phenyl may be substituted as above for substituted phenyl, or C_1–C_4 alkylguanidino; and

R^3 and R^4 are, independently, hydrogen, C_1–C_4 alkyl, C_1–C_4 alkoxy, fluorine or chlorine, or non-toxic, pharmaceutically acceptable acid addition salts thereof.

25. A method of treating cardiac arrhythmias and myocardial ischemia in a mammal, including man, suffering from an arrhythmic or ischemic condition, comprising administering an amount of a compound of claim 14 effective to alleviate said arrhythmic or ischemic condition.

4,882,324

ESSENTIALLY PURE ACID HYDROXYL LIGAND ALUMINUM COMPLEXES AND THEIR PREPARATION

Arthur P. G. Wright, 98 Spragg Cir., Markham, Ontario, Canada (L3P 5C2); Betty P. L. Wen, 89 Bushmills Sq., Scarborough, Ontario, Canada (M1V 1K5); Terry G. Schenck, 74 Water Wheelway, Willowdale, Ontario, Canada (M2H 3E5), and Antonina Maron, 12 Willowmount Dr., Scarborough, Ontario, Canada (M1L 1Y1)

Division of Ser. No. 937,155, Dec. 2, 1986, Pat. No. 4,772,724.
This application Jun. 2, 1988, Ser. No. 201,669
Claims priority, application Canada, Nov. 21, 1986, 523590
Int. Cl.[4] A61K *31/33, 37/44*
U.S. Cl. 514—191 7 Claims

1. A method for treating a physiological condition in a mammalian body that is benefited from treatment with an antacid which comprises administering to said mammalian body an antacid effective quantity of at least one essentially pure complex of an acid hydroxyl ligand and aluminum having an acid neutralization capacity of at least 5 mEq/g and the formula:

$$Al(L)_x(OH)_y$$

wherein:
X=0.5 or 1
Y=2 and
L is an acid hydroxyl ligand wherein the acid hydroxyl ligand is selected from the group consisting of serine, homoserine, threonine, tyrosine, hydroxyproline, bicine, tricine and hydroxylysine when x=1 and pamoic acid when x=0.5.

4,882,325

CRYSTALLINE 1,1-DIOXOPENICILLANOYLOXYMETHYL 6-(D-AMINO-PHENYLACETAMIDO)PENICILLANATE NAPSYLATE AND METHOD OF USING THE SAME

Wagn O. Godtfredsen, Vaerlose, and Welf von Daehne, Rungsted Kyst, both of Denmark, assignors to Leo Pharmaceutical Products Ltd. A/S, Ballerup, Denmark

Continuation of Ser. No. 304,050, Sep. 21, 1981, abandoned. This application Oct. 21, 1988, Ser. No. 262,150

Claims priority, application United Kingdom, Oct. 6, 1980, 8032147

Int. Cl.[4] A61K *31/43*; C07D *499/32, 499/22*

U.S. Cl. 514—195 **3 Claims**

1. Crystalline 1,1-dioxopenicillanoyloxymethyl 6-(D-α-amino-α-phenylacetamido)penicillanate napsylate monohydrate.

3. A method of treating patients suffering from bacterial infectious diseases which comprises the administration of an effective amount of a compound according to claim 1.

4,882,326

PIPERIDINE COMPOUNDS AND PHARMACEUTICAL USES THEREOF

Shu Murakami, Fukuoka; Tsuguo Ikebe, Oita; Ichiro Hakamada, Oita, and Osamu Yaoka, Oita, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

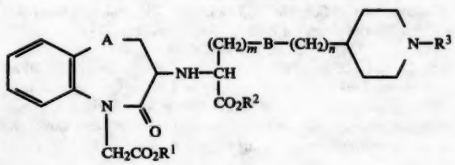
Filed May 24, 1988, Ser. No. 197,877

Claims priority, application Japan, May 25, 1987, 62-129414; Oct. 14, 1987, 62-259379

Int. Cl.[4] A61K *31/55*; C07D *281/02*

U.S. Cl. 514—211 **3 Claims**

1. A piperidine compound of the formula:



wherein A represents a methylene group, an oxygen atom or a sulfur atom; B represents an oxygen atom or a sulfur atom; R^1 and R^2 independently represent a hydrogen atom, a lower alkyl group or an aralkyl group; R^3 represents a hydrogen atom or an amino protective group; m represents 1 or 2; and n represents an integer of 0 to 3, or a pharmaceutically acceptable salt thereof.

3. A pharmaceutical composition which comprises a therapeutically effective amount of the piperidine compound as claimed in claim 1 or 2 with a pharmaceutically acceptable additive.

4,882,327

CERTAIN HETEROCYCLIC N-SUBSTITUTED CARBOXAMIDES

Francis D. King, Essex, England, assignor to Beecham Group p.l.c., Middlesex, England

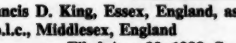
Filed Apr. 22, 1988, Ser. No. 185,111

Claims priority, application United Kingdom, Apr. 25, 1987, 8709857; May 5, 1987, 8710570; Jul. 14, 1987, 8716530; Jan. 16, 1988, 8800982

Int. Cl.[4] A61K *31/44*; C07D *471/04*

U.S. Cl. 514—219 **9 Claims**

1. A compound of formula (I), or a pharmaceutically acceptable salt thereof:

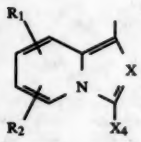


(I)

wherein

L is NH or O;

Y is a group of formula (a);



(a)

wherein

R_1 and R_2, are independently selected from hydrogen or halogen;

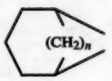
X is N or CR_3

wherein

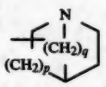
R_3 is hydrogen or C_{1-6} alkoxy;

R_4 is hydrogen, halogen, CF_3, C_{1-6} alkyl, C_{1-6} alkoxy, C_{1-6} alkylthio, C_{1-6} alkylsulphonyl, C_{1-6} alkylsulphinyl, C_{1-7} acyl, cyano, C_{1-6} alkoxycarbonyl, C_{1-7} acylamino, hydroxy, nitro or amino, aminocarbonyl, or aminosulphonyl, optionally N-substituted by one or two groups selected from C_{1-6} alkyl, C_{3-8} cycloalkyl, and C_{3-8} cycloalkyl C_{1-4} alkyl or disubstituted by C_4 or C_5 polymethylene; phenyl or phenyl C_{1-4} alkyl group optionally substituted in the phenyl ring by one or two of halogen, C_{1-6} alkoxy or C_{1-6} alkyl groups;

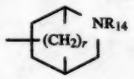
Z is a group of formula (d), (e) or (f):



(d)



(e)



(f)

wherein

n is 2 or 3;

p is 1 or 2;

q is 1 to 3;

r is 1 to 3; and

R_{13} or R_{14} is C_{1-4} alkyl.

4,882,328

THIAZETIDINE DERIVATIVES

Masahiro Kise, Kyoto; Masakuni Ozaki, Joyo; Kenji Kazuno, Shiga; Yoshifumi Tomii, Katano; Jun Segawa, and Shoji Yasufuki, both of Kyoto, all of Japan, assignors to Nippon Shinyaku Co. Ltd., Japan

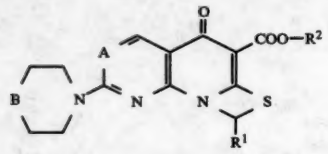
Filed Sep. 22, 1988, Ser. No. 247,959

Claims priority, application Japan, Sep. 22, 1987, 62/237729

Int. Cl.[4] C07D *475/00*; A61K *31/495*

U.S. Cl. 514—236.2 **27 Claims**

1. A compound of the formula



(I)

or a pharmaceutically acceptable salt thereof wherein R^1 is hydrogen, lower alkyl or phenyl unsubstituted or substituted by one or two halo moieties, R^2 is hydrogen or lower alkyl, A CX wherein X is halo, B is O or NR^3 wherein R^3 is hydrogen, lower alkyl, acyl, mono-, di- or tri-haloacyl, lower alkoxycarbonyl or (5-methyl-2-oxo-1,3-dioxolen-4-yl) methyl.

4,882,329

ALKOXYPHENYLINDOLINONE DERIVATIVES, MEDICAMENTS CONTAINING THEM AND THEIR USE

Ulrich Lerch, Hofheim am Taunus; Rainer Henning, Hattersheim am Main, and Joachim Kaiser, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 898,117, Aug. 20, 1986, abandoned.

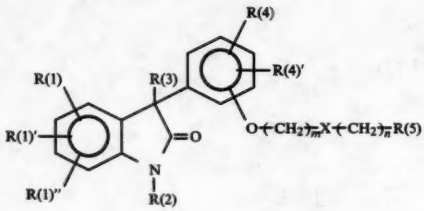
This application Jan. 30, 1989, Ser. No. 303,996

Claims priority, application Fed. Rep. of Germany, Aug. 22, 1985, 3529994

Int. Cl.[4] A61K *31/495;* **C07D** *403/12, 401/14*

U.S. Cl. 514—253 **5 Claims**

1. A compound of the formula I



(I)

in which

R(1), R(1)', and R(1)'' are identical or different and are independent of one another and are hydrogen, $(C_1–C_4)$-alkyl, $(C_1–C_3)$-alkoxy, F, Cl, Br, CF_3, nitro, hydroxyl, acetamido or amino,

R(2) is hydrogen, $(C_1–C_{10})$-alkyl, $(C_3–C_{10})$-alkenyl, phenyl-$(C_1–C_4)$-alkyl, the phenyl ring being unsubstituted or substituted by one, two or three substituents from the group consisting of $(C_1–C_4)$-alkyl, $(C_1–C_3)$-alkoxy, F, Cl, CF_3, $(C_1–C_2)$-alkylenedioxy and nitro,

R(3) is hydrogen, $(C_1–C_{15})$-alkyl, $(C_3–C_{15})$-alkenyl, $(C_4–C_8)$-cycloalkyl, $(C_4–C_8)$-cycloalkyl-$(C_1–C_4)$-alkyl, phenyl or phenyl-$(C_1–C_4)$-alkyl, the phenyl radical being unsubstituted or substituted by one, two or three substituents from the group consisting of $(C_1–C_4)$-alkyl, $(C_1–C_3)$-alkoxy, F, Cl, CF_3, $(C_1–C_2)$-alkylenedioxy and nitro,

R(4) and R(4)' are, independently of, one another, identical or different hydrogen, $(C_1–C_4)$-alkyl, $(C_1–C_3)$-alkoxy, F, Cl, CF_3, nitro, hydroxyl, acetamido or amino,

m is 1, 2, 3, or 4,

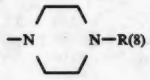
n is 0, 1, 2 or 3, but where X is a heteroatom n is only 2 or 3

X is a CH_2 group, oxygen, sulfur, a carbonyl group, a CH(OH) group or a group

in which

R(15) and R(15)' are identical or different and are hydrogen or $(C_1–C_4)$-alkyl,

R(5) is



in which

R(8) is hydrogen, $(C_1–C_{10})$-alkyl, $(C_1–C_8)$-alkanoyl, pyridyl, phenyl, phenyl-$(C_1–C_4)$-alkyl, phenyl-$(C_3–C_5)$-alkenyl, benzhydryl or benzhydryl-$(C_1–C_4)$-alkyl, phenyl-$(C_1–C_4)$-alkanoyl or benzoyl, the phenyl radicals each being unsubstituted or substituted by one, two or three radicals from the group consisting of $(C_1–C_4)$-alkyl, $(C_1–C_4)$-alkoxy, $(C_1–C_2)$-alkylenedioxy, F, Cl, Br, CF_3 and hydroxyl,

or a salt of the compound of the formula I with a pharmaceutically acceptable acid.

4,882,330

1-ARYLOXY-4-[((4-ARYL)-1-PIPERAZINYL]-2-BUTANOLS USEFUL AS ANTIALLERGY AGENTS

David A. Walsh, Richmond, and John M. Yanni, Chesterfield, both of Va., assignors to A. H. Robins Company, Incorporated, Richmond, Va.

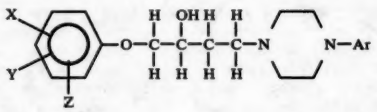
Continuation of Ser. No. 933,180, Nov. 21, 1986, abandoned.

This application Apr. 6, 1989, Ser. No. 333,673

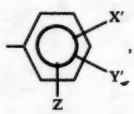
Int. Cl.[4] A61K *31/495*

U.S. Cl. 514—255 **51 Claims**

1. A method of combatting Type I allergic response in a living animal body in need thereof which comprises administering to said animal an effective amount of a compound selected from the group having the formula:



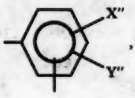
wherein Ar is selected from



or 2,3 or 4-pyridyl;

X and X' are selected from

hydrogen,
loweralkyl,
loweralkoxy,
halogen,
trifluoromethyl,
nitro,
amino,
acetylamino,
pheny, or



acetyl,
cyano,
aminocarbonyl,
carboxy, or
loweralkyl carboxylic acid ester;
Y,Y',Y'' and X'' are selected from the same group as X and X' except phenyl and substituted phenyl are excluded;
Z and Z' are selected from
hydrogen,
loweralkyl, or
loweralkoxy,
and the pharmaceutically acceptable salts and hydrates thereof.

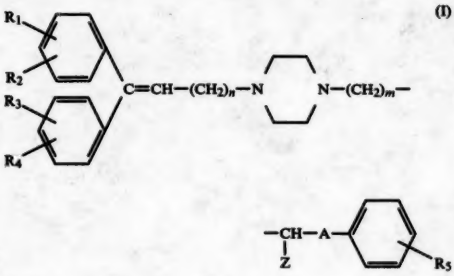
4,882,331

1-[(1,1-DIPHENYL)-1-ALKENYL]PIPERAZINE DERIVATIVES, METHOD OF PREPARATION AND PHARMACEUTICAL COMPOSITIONS IN WHICH THEY ARE PRESENT

André Buzas, Bievres, and Roland Ollivier, Olivet, both of France, assignors to Les Laboratoires Meram, France

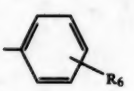
Filed Apr. 11, 1988, Ser. No. 179,750
Claims priority, application France, Apr. 14, 1987, 87 05311
Int. Cl.[4] A61K *31/495*; C07D *295/08, 295/10*
U.S. Cl. 514—255 **5 Claims**

1. 1-[(1,1-Diphenyl)-1-alkenyl]piperazine derivatives corresponding to formula I:



(I)

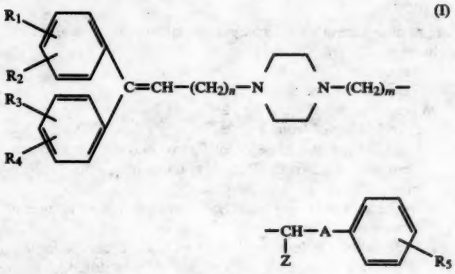
in which:
R_1, R_2, R_3, R_4 and R_5, which are identical or different, represent a hydrogen atom, a halogen atom, a lower alkyl group, a lower alkenyl group, a lower alkoxy group or the trifluoromethyl group;
n is an integer from 1 to 3;
m is an integer from 0 to 3;
Z represents a hydrogen atom, a lower alkyl group or an aryl group of the formula:



in which
R_6 has the same meaning as R_1, R_2, R_3 or R_4; and
A is an oxygen atom or a group

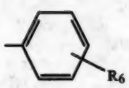
and their pharmaceutically acceptable salts.

5. A method for treating depressant which comprises administrating an antidepressant effective amount of a piperazine derivative corresponding to formula I:



(I)

in which:
R_1, R_2, R_3, R_4 and R_5, which are identical or different represent a hydrogen atom, a halogen atom, a lower alkyl group, a lower alkenyl group, a lower alkoxy group or the trifluoromethyl group;
n is an integer from 1 to 3;
m is an integer from 0 to 3;
Z represents a hydrogen atom, a lower alkyl group or an aryl group of the formula:



in which
R_6 has the same meaning as R_1, R_2, R_3 or R_4; and
A is an oxygen atom or a group

and their pharmaceutically acceptable salts for the manufacture of drugs active on the central nervous system.

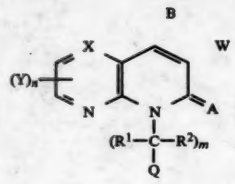
4,882,332

IMMUNE SUPPRESSION METHOD EMPLOYING ARLY-SUBSTITUTED NAPHTHYRIDINE AND PYRIDOPYRAZINE DERIVATIVES

Marvin I. Siegel, Woodbridge, and Sidney R. Smith, Ridgewood, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed Oct. 20, 1986, Ser. No. 921,288
Int. Cl.[4] A61K *31/495, 31/44*
U.S. Cl. 514—255 **13 Claims**

1. A method for suppressing T cell functions of the immune response in a mammal which comprises administering to a mammal in need of such treatment an immunosuppressing effective amount of a compound having the structural formula I



or a pharmaceutically acceptable salt or solvate thereof, wherein:

X represents CH or N;

A represents O or S,

m is an integer of from 0 to 2;

n is an integer of from 0 to 2;

R^1 and R^2 are the same or different and each is independently selected from H or alkyl containing 1 to 6 carbon atoms;

W represents —O— or $—S(O)_p—$, wherein p is an integer of from 0 to 2;

B represents alkylene having from 2 to 8 carbon atoms, which alkylene may be optionally substituted with a group selected from —OH, —F, alkyl having 1 to 4 carbon atoms, $—CH_2OH$, —CHO, $—CO_2H$, $—COR^3$ wherein R^3 is selected from $—NHR^4$, $—N(R^4)_2$ or $—OR^4$ wherein R^4 is alkyl of 1 to 6 carbon atoms or —CN, with the proviso that OH or F is not on the carbon atom adjacent to W;

Q represents an aryl group containing from 6 to 15 carbon atoms or an aromatic heterocyclic group containing from 3 to 14 carbon atoms and having at least one O, S or N in the ring, which aryl or aromatic heterocyclic group can optionally be substituted with up to 3 substituents Y as defined below; and

each Y substituent is independently selected from —OH, hydroxymethyl, alkyl containing from 1 to 6 carbon atoms, halo, $—NO_2$, alkoxy containing 1 to 6 carbon atoms, $—CF_3$, —CN, cycloalkyl containing 3 to 7 carbon atoms, alkenyloxy containing from 3 to 6 carbon atoms, alkynyloxy containing from 3 to 6 carbon atoms, $—S(O)_p—R^4$ wherein R^4 and p are as defind above, $—CO—R^5$ wherein R^5 represents —OH, $—NH_2$, $—NHR^4$, $—N(R^4)_2$ or $—OR^4$ in which R^4 is as defined above, —O—D—COR^5 wherein D represents alkylene having from 1 to 4 carbon atoms and R^5 is as defined above, $—NH_2$, $—NHR^4$, $—N(R^4)_2$ wherein R^4 is as defined above or —NHCOH.

4,882,333

N-(5,6,7,8-TETRAHYDROPYRIDO[2,3-D]PYRIMIDIN-6-YL-ALKANOYL)-GLUTAMIC ACID DERIVATIVES

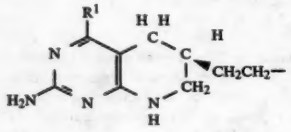
Chuan Shih, Indianapolis, Ind., and Edward C. Taylor, Princeton, N.J., assignors to The Trustess of Princeton University, Princeton, N.J. and Eli Lilly and Company, Indianapolis, Ind.

Filed May 25, 1988, Ser. No. 198,201

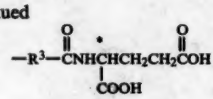
Int. Cl.[4] A61K *31/505;* **C07D** *475/08*

U.S. Cl. 514—258 **13 Claims**

1. A compound selected from the group consisting of a glutamic acid derivative having the formula:



-continued



in which:

R^1 is —OH or $—NH_2$;

R^3 is a carbon-carbon bond, alkylene of 1 to 4 carbon atoms, or cyclohexylene;

the configuration about the carbon atom designated • is S; and

the pharmaceutically acceptable salts thereof.

4,882,334

N-(5,6,7,8-TETRAHYDROPYRIDO]2,3-D]PYRIMIDIN-6-YLETHL-THINEYL-AND FURYLCARBONYL)-GLUTAMIC ACID DERIVATIVES

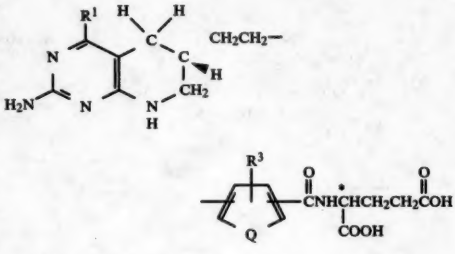
Chuan Shih, Indianapolis, Ind., and Edward C. Taylor, Princeton, N.J., assignors to The Trustees of Princeton University, Princeton, N.J. and Eli Lilly and Company, Indianapolis, Ind.

Filed May 25, 1988, Ser. No. 198,207

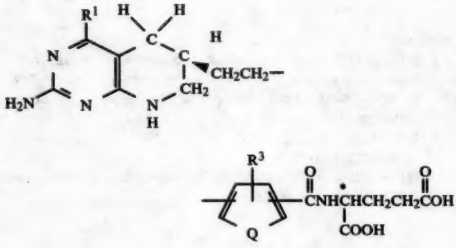
Int. Cl.[4] A61K *31/505;* **C07D** *475/08*

U.S. Cl. 514—258 **9 Claims**

1. A compound selected from the group consisting of a glutamic acid derivative having the formula:



or



in which:

Q is —O— or —S—;

R^1 is —OH or $—NH_2$;

R^3 is hydrogen, chloro, or fluoro;

the configuration about the carbon atom designated • is S; and

the pharmaceutically acceptable salts thereof.

4,882,335

METHOD FOR TREATING ALCOHOL-DRINKING RESPONSE

John D. Sinclair, Espoo, Finland, assignor to Alko Limited, Helsinki, Finland

Filed Jun. 13, 1988, Ser. No. 205,758
Int. Cl.[4] A61K *31/44*
U.S. Cl. 514—282 8 Claims

1. A method for treating alcoholism by extinguishing the alcohol-drinking response, comprising the steps of:

repeatedly administering to a subject suffering from alcoholism, an opiate antagonists selected from the group consisting of naloxone, naltrexone, cyclazocine, diprenorphine, etazocine, levalorphan, metazocine, nalorphine and salts thereof in a daily dosage sufficient to block the stimulatory effect of alcohol;

while the amount of antagonist in the subject's body is sufficient to block the stimulatory effect of alcohol, having the subject drink an alcoholic beverage; and

continuing the steps of administration of the opiate antagonist and drinking of an alcoholic beverage until the alcohol-drinking response is extinguished.

4,882,336

METHOD AND PHARMACEUTICAL COMPOSITION FOR TREATING LEUKOENCEPHALITIC DEMYELINIZATION CLINICAL PATTERNS OF AUTOIMMUNE ORIGIN, PARTICULARLY MULTIPLE SCLEROSIS

Gabor Tigyi, Irvine, Calif.; Bela Bozoky; Zsuzsanna Szegvari, both of Szeged, Hungary; Tibor Frank, Budapest, Hungary; Gyorgy Hajos, Budapest, Hungary; Laszlo Szporny, Budapest, Hungary, and Lilla Forgacs, Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt., Budapest, Hungary

Filed Aug. 17, 1988, Ser. No. 233,076
Claims priority, application Hungary, Aug. 26, 1987, 3753/87
Int. Cl.[4] A61K *31/44*
U.S. Cl. 514—283 4 Claims

1. A method of treating demyelinization clinical patterns of autoimmune origin in an animal subject, which comprises administering to the subject a therapeutically effective amount of ethyl (+)-apovincaminate.

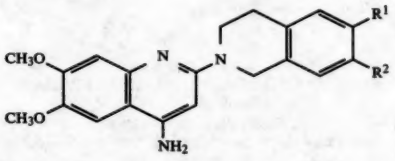
4,882,337

TETRAHYDROISOQUINOLINE ANTIARRHYTHMIC AGENTS

Nigel J. Cussans, New York, assignor to Pfizer Inc., New York, N.Y.

Filed Aug. 12, 1988, Ser. No. 232,345
Int. Cl.[4] A61K *31/47*; C07D *401/04*
U.S. Cl. 514—307 9 Claims

1. A compound of the formula:



or a pharmaceutically acceptable salt thereof, wherein one of R^1 and R^2 is methoxy and the other of R^1 and R^2 is hydroxy, —OCO(C_1–C_4 alkyl), —OCOPh or —OCOCH$_2$Ph where Ph is phenyl optionally substituted with up to two substituents each independently selected from halogen, trifluoromethyl, C_1–C_4 alkyl and C_1–C_4 alkoxy.

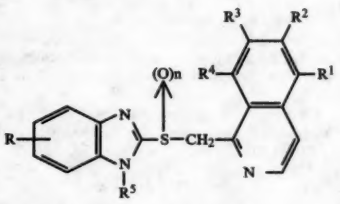
4,882,338

SUBSTITUTED ISOQUINOLINE DERIVATIVES AND ANTI-ULCER AGENTS

Kentaro Hirai, Kyoto, and Yukio Mizushima, Osaka, both of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed Jul. 1, 1987, Ser. No. 68,934
Claims priority, application Japan, Jul. 1, 1986, 61-155412
Int. Cl.[4] A61K *31/47*; C07D *401/12, 405/14*
U.S. Cl. 514—307 21 Claims

1. A compound of the formula:



(I)

(wherein R is hydrogen, hydroxy, methoxy, acetoxy, acetoxymethyl or trifluoromethyl;

R^1, R^2, R^3 and R^4 each is hydrogen, hydroxy, C_1–C_5 alkoxy which may be substituted by C_3–C_6 cycloalkyl or one or more halogens, acetoxy, propynyloxy, allyloxy or benzyloxy; or R^2 and R^3 taken together form methylenedioxy;

R^5 is hydrogen, hydroxymethyl, C_2–C_4 alkoxycarbonyl, C_2–C_5 acyloxymethyl or phthalidyl; and n is 0 or 1 except for the case in which R is methoxy and R^1, R^2, R^3, R^4 and R^5 each is hydrogen) or its pharmaceutically acceptable acid addition salt.

4. A method of treating a patient suffering from digestive ulcer which comprises administering to the patient a pharmaceutical composition according to claim 3.

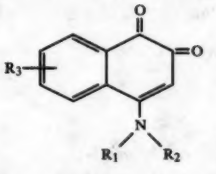
4,882,339

4-AMINO-SUBSTITUTED 1,2-DIHYDROXYNAPHTHALENE DERIVATIVES USEFUL IN INHIBITING 5-LIPOXYGENASE ACTIVITY IN MAMMALS

Jan W. F. Wasley, Chatham, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jul. 10, 1987, Ser. No. 71,956
Int. Cl.[4] A61K *31/445*
U.S. Cl. 514—319 11 Claims

1. A method of inhibiting 5-lipoxygenase activity in mammals which comprises administering to a mammal in need thereof an effective 5-lipoxygenase inhibiting amount of a compound of the formula III



(III)

wherein R_1 represents unsubstituted or lower alkyl-substituted C_3–C_7-cycloalkyl, unsubstituted or lower alkyl substituted C_7- or C_8-bicycloalkyl, unsubstituted or lower alkyl-substituted adamantyl, 4-piperidinyl or N-lower alkyl or aryl-lower alkyl-substituted piperidinyl, 1- or 2-indanyl, 1- or 2-tetrahydronaphthyl, 1- or 2-perhydroindanyl, 1- or 2-perhydronaphthyl; R_2 represents hydrogen, lower alkyl, C_3–C_7-cycloalkyl, aryl-lower alkyl, C_3–C_7-cycloalkyl-lower alkyl, lower alkanoyl or aryl-lower alkanoyl; R_3 represents hydrogen, lower

alkyl, halogen or lower alkoxy; aryl in the above definitions represents phenyl or phenyl mono- or di-substituted by one or two radicals selected from lower alkyl, lower alkoxy, halogen, cyano and trifluoromethyl, or aryl represents 1- or 2-naphthyl; or a pharmaceutically acceptable acid-addition salt of any said basic compound of formula III; or of a pharmaceutical composition comprising any said compound in combination with one or more pharmaceutically acceptable carriers.

4,882,340

BENZOFURAN DERIVATIVE AND PROCESSES FOR PREPARING THE SAME

Ikuo Iijima, Urawa; Masakatsu Ozeki, Wako; Yutaka Saiga, Ageo; Tohru Ishizuka, Kitamoto, and Kunio Nosaka, Kasukabe, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

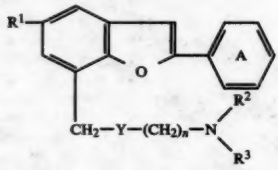
Filed Sep. 2, 1988, Ser. No. 239,754

Claims priority, application Japan, Sep. 4, 1987, 62-222754

Int. Cl.[4] C07D *307/78, 405/2;* **A61K** *31/34, 31/445*

U.S. Cl. 514—320 **8 Claims**

1. A benzofuran derivative of the formula:



(I)

wherein R^1 is hydrogen atom, a lower alkoxy group or a halogen atom, one of R^2 and R^3 is a lower alkyl group and the other is a lower alkyl group or a phenyl-lower alkyl group, or R^2 and R^3 combine together with adjacent nitrogen atom to form a pyrrolidino group, piperidino group or morpholine group, Ring A is a phenyl group or a phenyl group substituted with a lower alkyl group, a lower alkoxy group or a halogen atom, Y is oxygen atom or sulfur atom and n is an integer of 2 or 3, or a pharmaceutically acceptable salt thereof.

4,882,341

AMINO SUBSTITUTED PROPENOATES AND THEIR USE AS FUNGICIDES

John M. Clough, High Wycombe, and Ian T. Kay, Wokingham, both of England, assignors to Imperial Chemical Industries PLC, London, England

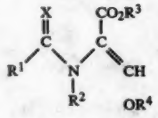
Continuation of Ser. No. 785,851, Oct. 9, 1985, abandoned. This application Sep. 9, 1988, Ser. No. 243,146

Claims priority, application United Kingdom, Oct. 19, 1984, 8426472; May 23, 1985, 8513105

Int. Cl.[4] A61K *31/44, 31/335, 31/38, 31/21;* **C07D** *213/00, 413/00, 333/22, 307/02;* **C07C** *101/02, 101/44, 69/74, 101/30*

U.S. Cl. 514—332 **9 Claims**

1. Compounds having the formula (I):



(I)

and stereoisomers thereof, wherein X is an oxygen or a sulphur atom and R^1, R^2, R^3 and R^4, which may be the same or different, are alkyl; haloalkyl; cycloalkyl; cycloalkylalkyl; alkenyl which can be substituted by alkyl, cycloalkyl, alkenyl itself substituted by phenyl, naphthyl, phenyl or an aromatic heterocyclic group in which the phenyl and aromatic heterocyclic groups can be substituted by fluorine, chlorine, bromine, nitro, C_{1-4} alkyl, C_{1-4} alkoxy, methoxycarbonyl, carboxyl, acetyl or nitrile; alkynyl which can be substituted by phenyl; phenyl or naphthyl which can be substituted by chlorine or methoxy; benzyl; phenethyl or phenoxymethyl.

6. A process for combating fungi which comprises applying to a plant, to seed of a plant, or to the locus of a plant or seed, a fungicidally effective amount of a compound according to claim 1.

4,882,342

5-ALKYLBENZIMIDAZOLES, METHOD OF USE AND PHARMACEUTICAL COMPOSITIONS

Wolfgang von der Saal, Weinheim; Jens-Peter Hölck, Mannheim; Alfred Mertens, Schriesheim; Bernd Müller-Beckmann, Grünstadt, and Lothar Kling, Mannheim, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

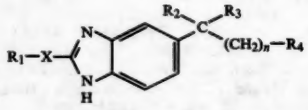
Filed Oct. 6, 1987, Ser. No. 106,413

Claims priority, application Fed. Rep. of Germany, Oct. 7, 1986, 3634066

Int. Cl.[4] C07D *401/04, 401/12;* **A61K** *31/415*

U.S. Cl. 514—338 **17 Claims**

1. A 5-alkylbenzimidazole of the formula:



I

wherein

R_1 is a heterocyclic six-membered pyridyl or N-oxypyridyl ring optionally substituted by C_1–C_6 alkyl, C_1–C_6 alkoxy, C_1–C_6 alkylthio, hydroxyl, nitro, amino, halogen or cyano;

R_2 and R_3, which can be the same or different, are hydrogen or C_1–C_6 alkyl or R_2 and R_3, together with the carbon atom to which they are attached, represent a C_3–C_7 carbocyclic ring;

R_4 is cyano, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, hydrazinocarbonyl or amino wherein the hydrazinocarbonyl or the amino group may be substituted by a formyl, alkylcarbonyl, trifluoromethylcarbonyl, alkylsulphonyl, trifluoromethylsulphonyl, phenylsulphonyl, alkylaminocarbonyl or dialkylaminocarbonyl, wherein the alkyl moieties comprise up to 6 carbons;

X is a valency bond, C_1–C_4 alkylene, vinylene or imino group —NH— or carbonylamino group —CONH—; and

n is 0 or 1 to 5;

or the tautomer thereof or a physiologically acceptable salt thereof with an inorganic and organic acid.

4,882,343

BIARYLALKYLIMIDAZOLE DERIVATIVES AS ANTI-DEPRESSANTS

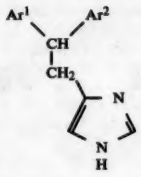
Alex A. Cordi, St. Louis, Mo., and Hugo J. Gorissen, Grez-Doiceau, Belgium, assignors to G. D. Searle & Co., Chicago, Ill.

Filed Aug. 28, 1987, Ser. No. 90,890

Int. Cl.[4] A61K *31/44;* **C07D** *401/06*

U.S. Cl. 514—341 **22 Claims**

11. A method for treatment of depressive or degenerative diseases of the central nervous system, said method comprising administrating to a patient an effective dose of a compound of Formula I:



or a tautomer thereof;

wherein each of Ar^1 and Ar^2 independently represents an aromatic heterocyclic group selected from a furan group, a thiophene group, a pyrrole group, an N-alkyl-pyrrole group, an N-phenyl-pyrrole group, an imidazole group and a pyridyl group, any one of which groups may be unsubstituted or substituted by one or two linear or branched alkyl or alkoxy groups having one to three carbon atoms;

and wherein at least one of Ar^1 and Ar^2, but not both, may represent a phenyl group or a phenyl group substituted by one or two groups selected from halogen atoms comprising fluorine, chlorine and bromine atoms, trifluoromethyl groups and linear or branched alkyl or alkoxy groups having one to three carbon atoms;

with the proviso that at least one of Ar^1 and Ar^2 groups represents an aromatic heterocyclic group as defined above;

or the corresponding optically pure isomers thereof or a racemic or non-racemic mixture of said isomers, or a non-toxic acid addition salt thereof formed with a pharmaceutically acceptable acid.

4,882,344

PYRIDYLMETHYL-4-THIAZOLINES

Kozo Shiokawa, Kawasaki; Shinichi Tsuboi; Shoko Sasaki, both of Hino; Koichi Moriya, Tokyo; Yumi Hattori, and Katsuhiko Shibuya, both of Hachioji, all of Japan, assignors to Nihon Tokushu Noyaku Seizo K.K., Tokyo, Japan

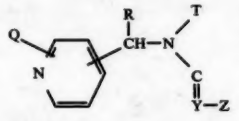
Division of Ser. No. 88,932, Aug. 24, 1987, Pat. No. 4,803,277. This application Sep. 13, 1988, Ser. No. 243,545

Claims priority, application Japan, Oct. 9, 1986, 61-211753

Int. Cl.[4] C07D *417/06;* A61K *31/44*

U.S. Cl. 514—342 **4 Claims**

1. A heterocyclic compound of the formula



wherein

Q is at least one substituent selected from halogen atoms, C_1–C_4 alkyl groups optionally substituted by halogen, C_1–C_4 alkoxy groups optionally substituted by halogen, C_2–C_4 alkenyl groups optionally substituted by halogen, C_1–C_4 alkylsulfinyl groups, C_1–C_4 alkylsulfonyl groups and C_3–C_4 alkynyl groups,

R represents a hydrogen atom or a methyl group,

Y represents =N— or =CH—,

Z represents a nitro group or a cyano group, and

T represents —CH=CH—S—, wherein the S is attached to

said 5-membered unsaturated heterocyclic ring being optionally substituted by at least one of halogen atoms and C_1–C_4 alkyl groups optionally substituted by halogen.

4,882,345

USE OF A COMPOUND FOR THE TREATMENT OF SCHIZOPHRENIA

Claude Gueremy, Houilles; Francoise Maillard, La Celle Saint Cloud, and Bruno Musch, Paris, all of France, assignors to Rhone-Poulenc Sante, Antony, France

Filed Aug. 22, 1988, Ser. No. 234,602

Claims priority, application France, Aug. 25, 1987, 87 11882

Int. Cl.[4] A61K *31/425*

U.S. Cl. 514—367 **4 Claims**

1. Method of treatment of schizophrenia comprising administering to a subject suffering therefrom or liable thereto an effective amount of 2-amino-6-(trifluoromethoxy)-benzothiazole or pharmaceutically acceptable salt thereof.

4,882,346

CHEMICAL DIFFERENTIATING AGENTS

John S. Driscoll, Rockville; Alberto Haces, Frederick, and Theodore Breitman, Rockville, all of Md., assignors to The United States of America as reprsented by the Department of Health and Human Services, Washington, D.C.

Filed Jun. 16, 1987, Ser. No. 62,422

Int. Cl.[4] A61K *31/415*

U.S. Cl. 514—389 **4 Claims**

1. A method for causing malignant cells to differentiate to a less malignant phenotype comprising treating said malignant cells with an effective amount of a pharmaceutical composition comprising an effective amount of 3,3'-(1,6-hexanediyl)-bis([5,5-dimethyl-2,4-imidazolinedione] in a pharmaceutical acceptable carrier.

4,882,347

"N-IMIDAZOLYL DERIVATIVES OF BICYCLIC COMPOUNDS AND PHARMACEUTICAL COMPOSITIONS CONTAINING THE SAME"

Paolo Cozzi, Milan; Corrado Ferti, Barlassina; Patricia Salvati, Arese; Germano Carganico, and Antonio Pillan, both of Milan, all of Italy, assignors to Farmitalia Carlo Erba, S.r.l., Milan, Italy

Filed Jun. 2, 1988, Ser. No. 201,909

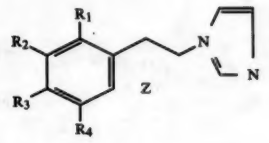
Claims priority, application United Kingdom, Jun. 3, 1987, 8712994; Jun. 3, 1987, 8712995

Int. Cl.[4] A61K *31/415*

U.S. Cl. 514—396 **5 Claims**

1. A method of treating nephropathies in mammals, said nephropathies being selected from the group consisting of glumerulonephritis, nephropathy secondary to lupus erithematosus, and hyperlipidaemias secondary to nephrotic syndrome, which comprises administering to said mammals an effective amount of a pharmaceutical composition comprising:

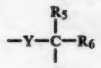
(a) a therapeutically effective amount of a compound of the formula (I):



(I)

wherein

(I) —Z— is:



wherein Y completes a single bond or is oxygen or a $—CH_2—$ group and the symbol:

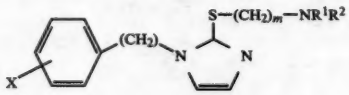
represents a single or a double bond, or
(II) —Z— is:

and the symbol:

represents a double bond; one of R_1, R_2, R_3, R_4 is $—CH_2OH$, C_2–C_4 acyl, $—CONR_7R_8$, $—COOR_7$, $—CH_2—COOR_7$, $—CH_2CONR_7R_8$, $—CH=C(R_7)—COOR_8$ or $—CH=C(R_9)—CONR_7R_8$ in which each of R_7, R_8 and R_9 is independently hydrogen or C_1–C_4 alkyl and the others are independently selected from the group consisting of hydrogen, hydroxy, halogen, C_1–C_4 alkyl, C_1–C_4 alkoxy and $—COOR_7$, wherein R_7 is as defined above, and one of R_5 and R_6 is hydrogen and the other is hydrogen, C_1–C_6 alkyl or phenyl; and
(b) a pharmaceutically acceptable carrier.

4,882,348
2-(AMINOALKYLTHIO)IMIDAZOLES AS DOPAMINE-β-HYDROXYLASE INHIBITORS
Lawrence I. Kruse, Tewin, England; Stephen T. Ross, Berwyn, and Eliot H. Ohlstein, Plymouth Valley, both of Pa., assignors to SmithKline Beckman Corporation, Philadelphia, Pa.
Filed Dec. 29, 1987, Ser. No. 139,217
Int. Cl.[4] A61K *31/415*; C07D *233/84*
U.S. Cl. 514—398 **9 Claims**

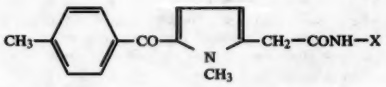
1. Compound of the formula:



in which:
X is H. F, Cl, Br. I,C_{1-4}alkyl, CN, NO_2, SO_2NH_2, COOH, OH, CHO, C_{1-4}alkoxy, CH_2OH, CH_2OC_{1-4}alkyl, CF_3, C_2F_5, C_3F_7, SO_2CH_3, SO_2CF_3, or $CO_2C_aH_{2a+1}$wherein a is 1–5, or any accessible combination thereof of up to 5 substituents;
n is 1–5;
m is 2–5; and
R^1 and R^2 are H or a pharmaceutically acceptable salt or hydrate thereof.

4,882,349
PYRROLACETIC AMIDES HAVING ANTIINFLAMMATORY ACTIVITY
Alessandro Baglioni, Rome, Italy, assignor to Sigma-Tau Industrie Farmaceutiche Riunite S.p.A, Rome, Italy
Division of Ser. No. 467,308, Feb. 17, 1983, abandoned. This application Feb. 11, 1985, Ser. No. 700,059
Claims priority, application Italy, Feb. 26, 1982, 47881 A/82
Int. Cl.[4] A61K *31/40*; C07D *207/323*
U.S. Cl. 514—423 **11 Claims**

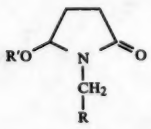
6. A method of treating a patient in need of an analgesic, an anti-inflammatory or anti-pyretic comprising administering to the patient a pharmaceutical composition comprising a therapeutically effective amount of a compound of the formula:



wherein X is selected from the group consisting of $CH_2COOC_2H_5$, CH_2COOH, CH_2CH_2SH and $CH(CH_2SH)COOCH_3$ and a pharmaceutically acceptable salt thereof.

4,882,350
DERIVATIVES OF 1-BENZYL-2-OXO-5-ALKOXY-PYRROLIDINE, AND MEDICAMENT COMPOSITIONS CONTAINING THEM
Emilio Toja; Carlo Gorini, both of Milan; Fernando Barzaghi, and Giulio Galliani, both of Monza, all of Italy, assignors to Roussel Uclaf, Paris, France
Filed Jun. 24, 1988, Ser. No. 211,288
Claims priority, application Italy, Jun. 25, 1987, 21046 A/87
Int. Cl.[4] A61K *31/40*; C07D *207/27*
U.S. Cl. 514—425 **7 Claims**

1. Compounds of the formula (I):



(I)

in which R′ represents hydrogen, linear, branched or cyclic alkyl containing up to 12 carbon atoms, alkenyl containing from 2 to 8 carbon atoms, acetyl, propionyl, butynyl or aralkyl containing from 7 to 15 carbon atoms and R represents phenyl, possibly substituted by one or more substituents selected from the group consisting of a free, esterified or etherified hydroxy radical in which the ester or ether part contains from 1 to 18 carbon atoms, the ketone and oxime functions, a linear, branched or cyclic, alkyl or alkenyl having up to 18 carbon atoms, halogen atoms, CF_3, SCF_3, OCF_3, NO_2, NH_2, C≡N, phenyl, or alkoxycarbonyl containing from 2 to 8 carbon atoms and alkyl-sulphonyl containing from 1 to 6 carbon atoms, provided that if R is unsubstituted phenyl, R′ does not represent methyl or ethyl.

4,882,351

TRICYCLIC COMPOUNDS

Etsuo Oshima, Shizuoka; Hiroyuki Obase, Mishima; Akira Karasawa; Kazuhiro Kubo, both of Shizuoka; Ichiro Miki, Wakabayashi, and Akio Ishii, Shizuoka, all of Japan, assignors to Roussel Uclaf, Paris, France

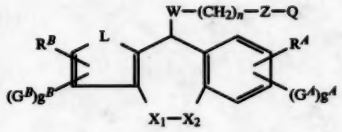
Filed Oct. 11, 1988, Ser. No. 255,485

Claims priority, application Japan, Oct. 14, 1987, 62-259145

Int. Cl.[4] A61K *31/335, 31/38;* C07D *313/12, 337/12*

U.S. Cl. 514—431 12 Claims

1. A tricycle compound represented by formula:



wherein X_1-X_2 represents $-CH_2O$ or

(wherein l represents 0, 1 or 2);

L represents —CH=CH— or —S—;

. . . . represents single bond or double bond;

W represents —S—, —O—, —NH—, $-CH_2-$, —NHCO— or =CH— (wherein the left side of each formula is bound to the tricycle nucleus);

n is 0, 1, 2 or 3;

Z represents $-NR^1CO-$, $-NR^1SO_2-$, $-NR^1CONH-$, $-NR^1CSNH-$, $-NR^1NHCONH-$, $-NR^1NHCSNH-$, $-NR^1COO-$ or $-NR^1COS-$ (wherein R^1 represents hydrogen or lower alkyl, in which the right side of each formula is bound to Q);

Q represents straight or branched alkyl having 1 to 18 carbon atoms, alicyclic alkyl having 3 to 6 carbon atoms, lower alkenyl having 2 to 6 carbon atoms, or optionally substituted aryl, optionally substituted aralkyl, optionally substituted aralkenyl, optionally substituted furyl or thienyl, or coumarinyl; wherein the substitution means 1 to 3 substituents on the aromatic ring and the substituents are independently selected from lower alkyl, phenyl, benzyl, halogen, trifluoromethyl, nitro, OR^2 and SR^2 (wherein R^2 represents hydrogen, lower alkyl, phenyl or benzyl);

one of R^A and R^B represents hydrogen and the other represents —Y—M wherein Y represents single bond, $-CR^3R^4-(CH_2)_m-$ or $-CR^3=CR^4-(CH_2)_m-$ (wherein each of R^3 and R^4 independently represents hydrogen or lower alkyl and m represents 0, 1, 2, 3 or 4, in which the left side of each formula is bound to the mother nucleus);

M represents $-COOR^5$ (wherein R^5 represents hydrogen or lower alkyl), $-CONR^{5a}R^{5b}$ (wherein each of R^{5a} and R^{5b} independently has the same significance as previously described for R^5);

each of G^A and G^B independently represents lower alkyl, halogen or OR^6 (wherein R^6 represents hydrogen, lower alkyl, phenyl or benzyl);

each of g^A and g^B independently represents 0, 1, 2 or 3; or a pharmaceutically acceptable salt thereof.

4,882,352

METHOD FOR TREATING SCHIZOPHRENIA

Alan S. Horn, Noordorn, Netherlands, assignor to Nelson Research & Development Co., Irvine, Calif.

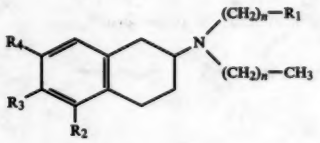
Continuation-in-part of Ser. No. 891,223, Jul. 28, 1986, and a continuation-in-part of Ser. No. 891,262, Jul. 28, 1986, Pat. No. 4,743,618, which is a continuation-in-part of Ser. No. 811,768, Dec. 20, 1985, Pat. No. 4,657,925, which is a continuation-in-part of Ser. No. 640,685, Aug. 13, 1984, Pat. No. 4,564,628, which is a continuation-in-part of Ser. No. 455,144, Jan. 3, 1983, abandoned. This application May 8, 1987, Ser. No. 47,882

The portion of the term of this patent subsequent to Jan. 14, 2003, has been disclaimed.

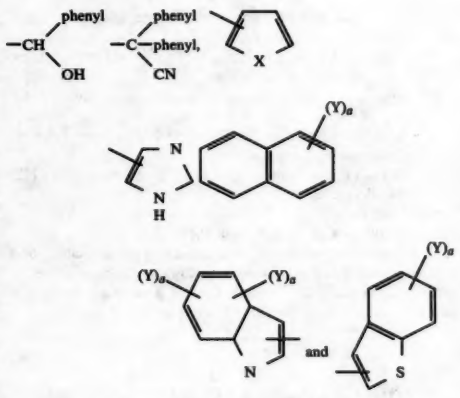
Int. Cl.[4] A61K *31/38, 31/34, 31/42, 31/45*

U.S. Cl. 514—438 31 Claims

1. A method for treating the symptoms of schizophrenia comprising activating the presynaptic D_2 dopamine receptors without substantially activating the postsynaptic receptors by administering to a schizophrenic an effective amount of a compound consisting essentially of the dextro (plus) isomers of compounds selected from the group represented by the general formula:



wherein R_1 is selected from the group consisting of phenyl, pyridyl



X is oxygen or sulfur, Y, if present, is selected from the group consisting of hydroxy, nitro, cyano, azido, amino, acylamino, carboxyamido, trifluoromethyl, sulfate, sulfonamido, halogen, hydrocarbyl and hetero atom-substituted hydrocarbyl radicals, wherein said heteroatoms are selected from the group consisting of halogen, nitrogen, oxygen, sulfur and phosphorus and said hydrocarbyl radicals comprise from 1 to 12 carbon atoms, and a is an integer between zero and 3,

R_2, R_3 and R_4 are each selected from the group consisting of H and OA, A is H or is selected from the group consisting of hydrocarbyl radicals, or

R_5 is selected from the group consisting of hydrocarbyl radicals and n is 2 or 3; with the proviso that at least one of R_2, R_3 and R_4 is H, that at least one of R_2, R_3 and R_4 is not H and that R_2 and R_4 are not both OA

4,882,353

CHROMAN DERIVATIVES FOR COMBATING THROMBOSIS AND ASTHMA

Ulrich Niewöhner, Wermelskirchen; Franz-Peter Hoever, Cologne; Folker Lieb, Leverkusen; Hermann Oediger, Cologne; Ulrich Rosentreter, Wuppertal; Horst Böshagen, Haan; Elisabeth Perzborn, Wuppertal; Volker-Bernd Fiedler, Leverkusen, and Friedel Seuter, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

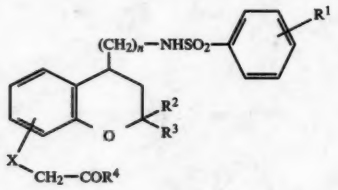
Filed Oct. 26, 1988, Ser. No. 263,143

Claims priority, application Fed. Rep. of Germany, Nov. 3, 1987, 3737195

Int. Cl.[4] A61K *31/35;* **C07D** *311/04*

U.S. Cl. 514—456 **11 Claims**

1. A chroman derivative of the formula



(I)

in which p1 R^1 stands for hydrogen, halogen, alkyl, hydroxyl, alkoxy, trifluoromethyl or cyano,

R^2 and R^3 are identical or different and stand for hydrogen, alkyl, cycloalkyl or aryl,

R^4 stands for hydroxyl, alkoxy, aryloxy, aralkoxy or for a group of the formula $—NR^5R^6$, where

R^5 and R^6 are identical or different and in each case denote hydrogen, alkyl, aryl or aralkyl,

X denotes a direct bond or an oxygen or sulphur atom, NH or N-alkyl, and

n denotes 0 or 1,

or a physiologically tolerable salt thereof.

7. A thrombocyte aggregation-inhibiting, vasodilating and bronchodilating composition comprising an amount effective therefor of a compound or salt thereof according to claim 1 and a physiologically tolerable diluent.

4,882,354

N-HYDROXY-5-PHENYL-2-FURANCARBOXIMIDAMIDES USEFUL AS CARDIOTONIC AGENTS

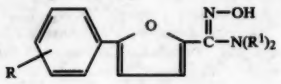
Chau-Ting Huang; Stanford S. Pelosi, Jr., and Allan V. Bayless, all of Norwich, N.Y., assignors to Norwich Eaton Pharmaceuticals, Inc., Norwich, N.Y.

Filed Dec. 16, 1987, Ser. No. 133,577

Int. Cl.[4] C07D *307/66*

U.S. Cl. 514—461 **9 Claims**

1. A method for increasing the contractile force of cardiac muscle of a mammal which comprises systemically administering to said mammal an effective amount of a composition comprising a compound conforming to the following chemical structure:



wherein

R is nil or mono-, di- or tri-substituents comprising 2-halo, 3-halo, 4-halo, 3-trifluoromethyl, 4-trifluoromethyl, 3-methyl, 3-ethyl, 3-methoxy, 3-ethoxy, 3-methoxycarbonyl, 4-methoxycarbonyl, 3-ethoxycarbonyl or 4-ethoxycarbonyl; each R^1 is independently selected from hydrogen or lower alkyl; or pharmaceutically acceptable salts and hydrates thereof.

4,882,355

NOVEL DIETHANOLAMINE TRIACTIC ACID TRIAMIDES AND METHODS FOR IMPROVING FEED UTILIZATION AND LACTATION IN RUMINANT ANIMALS

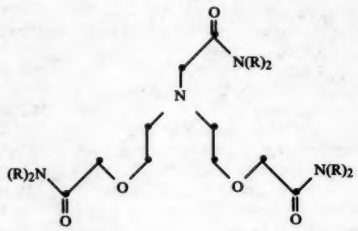
Alan W. White, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 81,064, Aug. 3, 1987, Pat. No. 4,800,213. This application Oct. 25, 1988, Ser. No. 262,375

Int. Cl.[4] A61K *31/16;* **C07C** *103/50*

U.S. Cl. 514—616 **7 Claims**

1. A method for improving lactation in lactating ruminants which comprises administering to said lactating ruminants a lactation improving amount of one or more compounds of the formula:



wherein each R may be the same or different and represents a straight or branches chain alkyl group of one to six carbon atoms,

or the physiologically acceptable salts thereof.

4,882,356

STABLE INJECTABLE ANTIEMETIC COMPOSITIONS

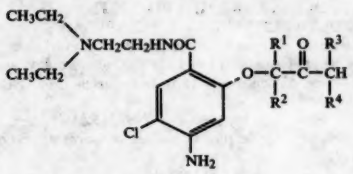
Munir N. Nassar, 5100 Highbridge St., #51F; Shreeram N. Agharkar, 7290 Wakefield Dr., both of Fayetteville, N.Y. 13066, and Joseph B. Bogardus, 8239 Penstock Way, Manlius, N.Y. 13104

Filed Mar. 10, 1987, Ser. No. 19,733

Int. Cl.[4] A61K *31/165*

U.S. Cl. 514—619 **12 Claims**

1. A method for inhibiting degradation via an intramolecular cyclization reaction of an arithmetic compound of the formula



I

wherein R^1, R^2 and R^3 each are independently hydrogen or methyl, and R^4 is hydrogen, a straight or branched chain alkyl group containing from 1 to 4 carbon atoms or, when R^3 is hydrogen, R^4 may be phenyl, or a non-toxic, pharmaceutically acceptable acid addition salt thereof, which comprises mixing an aqueous solution of a therapeutically effective amount from about 0.1% to about 5% (w/v) of said compound with a stabilizing agent which is a pharmaceutically acceptable water-miscible hydroxylic organic solvent in an amount of from about 5% to about 75% (w/v) or a water-soluble polyhydric alcohol in an amount of from about 5% to about 35% (w/v).

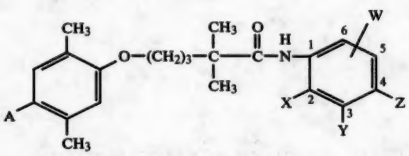
4,882,357

NOVEL N-(SUBSTITUTED-PHENYL)-5-(SUBSTITUTED-2,5-DIMETHYLPHENOXY)-2,2-DIMETHYLPENTANAMIDES

Paul L. Creger; Milton L. Hoefle, both of Ann Arbor, and Ann Holmes, Dexter, all of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

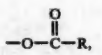
Filed Jul. 15, 1988, Ser. No. 219,964
Int. Cl.[4] A61K *31/165*; C07C *103/22*
U.S. Cl. 514—622 **12 Claims**

1. A compound of Formula I



I

or a pharmaceutically acceptable acid addition salt thereof, wherein A is hydrogen, hydroxy, alkoxy of from one to six carbon atoms or



in which R is an alkyl group of from one to six-carbon atoms; X and Y are each independently hydrogen, fluorine, nitro, $—NH_2$, NHR, in which R is as defined above, —NRR, in which R is as defined above, alkyl of from one to six carbon atoms, or alkoxy from one to six carbon atoms which may be substituted at the terminal carbon atom by $—CO_2R$, in which R is as defined above; Z and W are each independently hydrogen, fluorine, alkyl of from one to six carbon atoms, or alkoxy of from one to six carbon atoms which may be substituted at the terminal carbon atom by $—CO_2R$, in which R is as defined above, and at least one of X, Y, Z or W is not hydrogen.

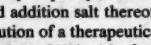
4,882,358

CARBOCYCLIC DERIVATIVES

Kenneth W. Bair, Chapel Hill, N.C., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.

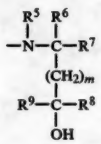
Continuation-in-part of Ser. No. 801,060, Nov. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 673,531, Nov. 20, 1984, abandoned. This application May 12, 1987, Ser. No. 48,763
Int. Cl.[4] A61K *31/015*
U.S. Cl. 514—654 **2 Claims**

1. A method for reducing the number of cells of a solid or ascitic tumor susceptible to such reduction in a mammal bearing said tumor comprising the administration of an effective tumor cell number reducing amount of a compound of formula (I)

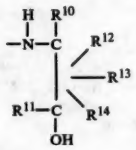


(I)

or a monomethyl or monoethyl ether thereof (the compound of formula (I) including these ethers may contain no more than 30 carbon atoms in total); acid addition salts thereof; wherein Ar naphthacenyl optionally substituted by one or two substituents, the substituents contain not more than four carbon atoms in total when taken together being the same or different and are selected from halogen; cyano; C_{1-4} alkyl or C_{1-4} alkoxy, each optionally substituted by hydroxy or C_{1-2} alkoxy; halogen-substituted C_{1-2} alkyl or C_{1-2} alkoxy; a group $S(O)_nR^2$ wherein n is an integer 0, 1 or 2 and R^2 is C_{1-2} alkyl optionally substituted by hydroxy or C_{1-2} alkoxy; or the ring system is optionally substituted by a group NR^3R^4 containing not more than 5 carbon atoms wherein R^3 and R^4 are the same or different and each is a C_{1-3} alkyl group or NR^3R^4 forms a five- or six-membered heterocyclic ring optionally containing one or two additional heteroatoms; R^1 contains not more than eight carbon atoms and is a group



or



wherein

m is 0 or 1;

R^5 is hydrogen;

R^6 and R^7 are the same or different and each is hydrogen or C_{1-5} alkyl optionally substituted by hydroxy;

R^8 and R^9 are the same or different and each is hydrogen or C_{1-3} alkyl;

—C—C— is five- or six-membered saturated carbocyclic ring;

R_{10} is hydrogen, methyl or hydroxymethyl;

R^{11}, R^{12} and R^{13} are the same or different and each is hydrogen or methyl;

R^{14} is hydrogen, methyl, hydroxy, or hydroxymethyl.

4,882,359
AZACYCLOALKANE DERIVATIVES, ABSORPTION PROMOTERS CONTAINING THE DERIVATIVES AS THE EFFECTIVE INGREDIENT AND EXTERNAL PREPARATIONS CONTAINING THE ABSORPTION PROMOTERS

Akira Nakagawa, Tosu, and Michinori Sakai, Mizuma, both of Japan, assignors to Hisamitsu Pharmaceutical Co., Ltd., Tosu, Japan

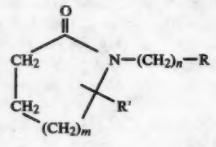
Filed Nov. 18, 1987, Ser. No. 131,193

Claims priority, application Japan, Apr. 8, 1986, 61-79174; PCT Int'l Appl., Feb. 10, 1987, PCT/JP87/00086

Int. Cl.[4] A61K *31/40, 31/395, 47/00*

U.S. Cl. 514—947 **10 Claims**

8. An external preparation for application to live body membranes, comprising a pharmaceutially-active agent and an absorption promoting agent comprising 0.001–25% of at least one member as the effective ingredient for promoting absorption, selected from azacycloalkane derivatives represented by the following general formula (I)



(I)

wherein R is —SR″ in which R″ is alkyl of 1–15 carbon atoms or —OR″ in which R″ is alkyl of 1–15 carbon atoms, R′ is hydrogen, alkyl or an alkyloxycarbonyl having 1–12 carbon atoms, m is 1 or 3 and n is an integer of 2–8 or 3–10 with the proviso that m is 1 or 3 respectively and inert excipients.

4,882,360
PROCESS FOR PRODUCING ALCOHOLS FROM SYNTHESIS GAS

Rex R. Stevens, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 903,878, Sep. 3, 1986, Pat. No. 4,752,622, which is a continuation of Ser. No. 636,000, Jul. 30, 1984, abandoned. This application Jun. 6, 1988, Ser. No. 202,755

The portion of the term of this patent subsequent to Jun. 21, 2005, has been disclaimed.

Int. Cl.[4] C07L *27/06*

U.S. Cl. 518—714 **10 Claims**

1. A process for making alcohols comprising contacting a mixture of hydrogen and carbon monoxide with a catalyst comprising:

(1) as a first component, molybdenum sulfide;

(2) as a second component, iron sulfide;

(3) as a third component, a promoter comprising an alkali or alkaline earth element in free or combined form,

said catalyst excluding rhodium, copper and ruthenium; at a pressure of at least about 500 psig and at conditions sufficient to form an alcohol fraction boiling in the range of motor gasoline in at least 50 percent CO_2 free carbon selectivity, said alcohol fraction containing a C_1 to C_{2-5} alcohol weight ratio of less than about 1:1.

4,882,361
PROCESS FOR THE PRODUCTION OF POLYURETHANE UREA ELASTOMERS

Andreas Ruckes; Gerhard Grögler, both of Leverkusen, and Richard Kopp, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Sep. 16, 1988, Ser. No. 245,846

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1987, 3732726

Int. Cl.[4] C08G *18/14*

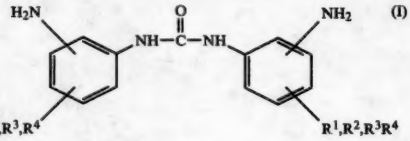
U.S. Cl. 521—51 **14 Claims**

1. A process for the production of a compact or cellular, elastomeric molding having a compact skin which comprises reacting as a one-shot system by the high-pressure or low-pressure reaction injection molding process

(a) an organic polyisocyanate,

(b) a polyhydroxyl or polyamine compound having a molecular weight of 600 to about 12,000 and containing at least two isocyanate-reactive hydrogen atoms and

(c) a chain-extending agent which comprises a diaminodiphenyl urea corresponding to the formula



(I)

wherein

R^1, R^2, R^3, and R^4 may be the same or different and represent hydrogen or a C_1–C_6-alkyl radical and

wherein the amino groups are in the m- and/or p-position to the urea group.

4,882,362
FOAMED MICROBEADS AND A PROCESS FOR THEIR PREPARATION

Norbert Weimann; Manfred Dahm; Ulrich Nehen, all of Leverkusen, and Walter Schäfer, Liechlingen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Division of Ser. No. 169,567, Mar. 17, 1988, Pat. No. 4,804,687. This application Oct. 7, 1988, Ser. No. 255,185

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1987, 3710607

Int. Cl.[4] C08V *9/22*

U.S. Cl. 521—54 **9 Claims**

1. Foamed microbeads with a shell and an encased core, in which

a. the shell is a crosslinking product of a polyamine and an NCO-containing carbodiimide,

b. the core is at least partly filled with a polymeric NCO-containing carbodiimide or its reaction product with a polyamine and

c. the foamed microbeads are self-supporting and are unladen.

4,882,363

PROCESS FOR THE PRODUCTION OF POLYURETHANE FOAM MOLDINGS

Alfred Neuhaus, Leverkusen; Otto Ganster, and Manfred Mengal, both of Odenthal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Dec. 6, 1988, Ser. No. 280,610

Claims priority, application Fed. Rep. of Germany, Dec. 11, 1987, 3742122

Int. Cl.[4] C08J *9/00, 9/12*

U.S. Cl. 521—122 2 Claims

1. A process for the production of a fluorocarbon-free, rigid polyurethane foam molding having a gross density of at least 300 kg/m^3 by in-mold foaming a reaction mixture comprising

(a) a polyisocyanate component comprising at least one aromatic polyisocyanate,

(b) at least one organic polyhydroxyl compound having an (average) hydroxyl functionality of at least 2.2 and an average OH number of at least 300 mg KOH/g,

(c) a blowing agent comprising water and/or carbon dioxide,

(d) a catalyst for the reaction between isocyanates and hydroxyl groups and

(e) a zeolitic absorbent having a pore diameter of at least 0.7 nm.

4,882,364

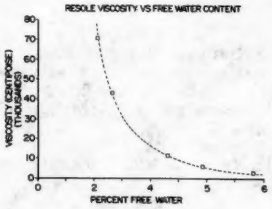
PROCESS FOR MANUFACTURING CLOSED CELL PHENOLIC FOAMS

Teresa M. Kyle, Burlington; Paul J. Meunier, and Edwin J. MacPherson, both of Sarnia, all of Canada, assignors to Fiberglas Canada Inc., Ontario, Canada

Continuation-in-part of Ser. No. 90,339, Aug. 28, 1987, abandoned. This application Apr. 25, 1988, Ser. No. 185,386

Int. Cl.[4] C08J *9/14*

U.S. Cl. 521—136 10 Claims



1. A process for producing a closed cell phenolic foam comprising the step of mixing to form a foaming composition:

(a) a phenol formaldehyde resole resin having substantially no free formaldehyde and having a water content of 4 to 8% and a viscosity of approximately 2,000 cps to 12,000 cps at 40° C.;

(b) a surfactant comprising an ethylene oxide-propylene oxide block copolymer capable of forming a gel with the foaming composition;

(c) a catalyst; and

(d) a blowing agent;

and curing the resulting foam.

4,882,365

POLYMERIZABLE RADIOPAQUE DENTAL COMPOSITION

Oswald Gasser, Seefeld, and Klaus Ellrich, Wörthsee, both of Fed. Rep. of Germany, assignors to ESPE Stiftung & Co. Produktions- und Vertriebs KG, Seefeld, Fed. Rep. of Germany

Division of Ser. No. 27,326, Mar. 18, 1987, Pat. No. 4,767,798. This application Aug. 11, 1988, Ser. No. 231,190

Claims priority, application Fed. Rep. of Germany, Mar. 18, 1986, 3609038

Int. Cl.[4] C08K *3/10;* A61K *6/08*

U.S. Cl. 523—117 8 Claims

1. A polymerizable, radiopaque dental composition comprising:

at least one ethylenically unsaturated, polymerizable substance up to 50% by weight selected from the group consisting of monomers and polymers; and

a heavy-metal fluoride with very low solubility and 1030% by weight of the total composition selected from the group consisting of complex heavy-metal fluorides having the general formula $M^{II}M^{IV}F_6$, where M^{II} is selected from the group consisting of calcium, strontium, and barium ions, and M^{IV} is selected from the group consisting of titanium, zirconium, and hafnium ions.

4,882,366

ENHANCING COLOR STABILITY TO STERILIZING RADIATION OF POLYMER COMPOSITIONS

Linda H. Nelson, Evansville, Ind.; Roger W. Avakian, Brasschaat, Belgium, and Arnold Factor, Scotia, N.Y., assignors to General Electric Company, Pittsfield, Mass.

Division of Ser. No. 769,277, Aug. 26, 1985, abandoned, which is a continuation-in-part of Ser. No. 579,103, Feb. 10, 1984, abandoned. This application Dec. 22, 1987, Ser. No. 136,683

Int. Cl.[4] C08K *5/21, 5/20*

U.S. Cl. 523—136 13 Claims

1. A medical article sufficiently irradiated to achieve sterilization, said article comprising an extruded admixture of (a) an aromatic carbonate polymer and (b) an effective amount of a stabilizing compound to inhibit yellowing upon sterilizing radiation exposure, wherein said compound is 2,2'-oxamide bis-(ethyl-3-(3,5-di-t- butyl-4-hydroxyphenyl)) propionate.

4,882,367

ARTICLES OF FILLED SYNTHETIC POLYMERIC MATERIALS AND GLASS BEAD FILLER THEREFORE

Pierre Laroche, Nalinnes, Belgium, assignor to Glaverbel, Brussels, Belgium

Division of Ser. No. 41,667, Apr. 20, 1987, Pat. No. 4,761,440, which is a continuation of Ser. No. 754,452, Jul. 11, 1985. This application Mar. 30, 1988, Ser. No. 175,286

Claims priority, application United Kingdom, Jul. 12, 1984, 8417740

Int. Cl.[4] B32B *1/00;* C08F *9/04*

U.S. Cl. 523—212 14 Claims

1. A polymeric article comprising a synthetic polymer matrix and a filler material, the synthetic polymer matrix being comprised of a synthetic polymer selected from the group consisting of polyamides, polystyrene, epoxy resins, and polyester resins, and the filler material being comprised of glass beads bearing at least one coating in a total coating amount ranging from 0.02 up to 1% by weight based on the weight of uncoated glass beads, which at least one coating comprises at least one coating agent comprising at least one silicon-functional silane selected from the group consisting of alkyl-silanes and aryl silanes and which at least one coating limits adhesion between the glass beads and the synthetic polymer matrix, and confers an increased impact resistance on the article as compared with an article which includes uncoated glass beads as filler material but is otherwise identical.

4,882,368

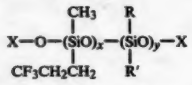
LOW COMPRESSION SET FLUOROSILICONE RUBBER

Janet L. Elias, Clareville, Australia; Chi-Long Lee, and Myron T. Maxson, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

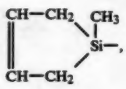
Filed Sep. 26, 1988, Ser. No. 249,055
Int. Cl.[4] C08K 9/06
U.S. Cl. 523—213 7 Claims

1. A fluorosilicone composition comprising

(A) 100 parts by weight of a polydiorganosiloxane having a general formula

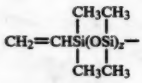


in which x has a value of at least 800, y has a value of from 0 to 20 percent of the sum of x plus y, the sum of x and y is at least 1000, each R is methyl or phenyl, each R' is vinyl or phenyl, where there is a maximum of 2 mol percent methylvinylsiloxane units in said polydiorganosiloxane, and each X is selected from the group consisting of hydrogen atom, methylphenylvinylsilyl, silyl of the formula



(I)

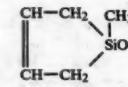
and a silyl group of the formula



(II)

in which z has a value of from 0 to 10, at least 5 weight percent of the polydiorganosiloxane has endgroups which are endgroups of formula (I) or formula (II),

(B) 5 to 100 parts by weight of a reinforcing silica filler having a surface area of at least 100 m^2/g where the silica surface is hydrophobed as a result of being treated with symmetrical tetramethyldi(3,3,3-trifluoropropyl)disilazane, combinations of symmetrical tetramethyldivinyldisilazane and symmetrical tetramethyldi(3,3,3-trifluoropropyl)disilazane, or combinations of bis-Si-(1-methyl-1-silacyclopentenyl)amine and symmetrical tetramethyldi(3,3,3-trifluoropropyl)disilazane, such that the surface has siloxy units selected from the group consisting of dimethyl(3,3,3-trifluoropropyl)siloxy units, a combination of dimethyl(3,3,3-trifluoropropyl)siloxy units and dimethylvinylsiloxy units, and a combination of dimethyl(3,3,3-trifluoropropyl)siloxy units and units of the formula



where at least 80 mol percent of the siloxy units have at least one of the organic groups which is 3,3,3-trifluoropropyl, said siloxy units being present in amounts such that there is at least 2 parts by weight of silica per part by weight of siloxy unit, and

(C) a curing amount of a vinyl specific organic peroxide.

4,882,369

HIGH STRENGTH FLUOROSILICONE SEALANTS

Myron T. Maxson, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Apr. 15, 1988, Ser. No. 181,849
Int. Cl.[4] C08K 9/06; C08L 83/04
U.S. Cl. 523—213 15 Claims

1. A method of producing a high strength, extrudable fluorosilicone sealant which cures upon exposure to moisture, said method comprising the steps of

(A) mixing

(i) from 30 to 50 parts by weight of hydroxyl endblocked fluorosilicone polymer of the formula $HO(RR'SiO)_nH$, where each R is individually a monovalent saturated or aromatic hydrocarbon radical containing from 1 to 20 carbon atoms, from 50 to 100 percent of the R' radicals represent the radical $RfCh_2CH_2$— where Rf represents a perfluoroalkyl radical containing from 1 to 10 carbon atoms, any remaining R' radicals being selected from the same group as R, and n represents an integer from 100 to 500,

(ii) from 15 to 50 parts by weight of a reinforcing silica having a surface area of greater than 50 m^2/g,

(iii) from 5 to 15 parts by weight of di(trifluoropropyl)tetramethyldisilazane, and

(iv) from 1.0 to 3.6 parts by weight of water, then

(B) heating the mixture to a temperature of from 150° to 175° C. for from ½ to 3 hours while mixing, under a nitrogen purge, then

(C) applying a vacuum to the heated mixture for a sufficient time to remove volatiles, then

(D) admixing 100, minus the parts of fluorosilicone polymer used in step (A), parts by weight of the fluorosilicone polymer of step A, then

(E) heating the devolatilized mixture to a temperature of from 150° to 175° C. for from ½ to 1 hour while mixing, then

(F) applying a vacuum to the heated mixture for a sufficient time to remove volatiles, and then cooling to room temperature, and then

(G) admixing, in the absence of moisture, a moisture activated curing system which reacts with the hydroxyl endblocked polymer, to give a fluorosilicone sealant containing an in situ treated filler, which sealant cures upon exposure to moisture to an elastomer having improved physical properties.

4,882,370

FIBER REINFORCED COMPOSITES WITH IMPROVED GLASS TRANSITION TEMPERATURES

Robert C. Jordan, and Gene B. Portelli, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 27, 1988, Ser. No. 149,101
Int. Cl.[4] C08K 7/10, 7/04; C08L 63/00
U.S. Cl. 523—215 25 Claims

1. A fiber reinforced composite structure having when cured a glass transition temperature greater than 150° C comprised of:

(a) reinforcing fiber and

(b) a curable epoxy resin composition comprising

(i) one or more epoxides having more than one epoxide group per molecule, of which epoxides at least 10 percent by weight is a 9,9-bis[4-(2,3-epoxypropoxy)phenyl]fluorene, all of the fluorane epoxy present being free of ortho substitution; and

(ii) an effective amount of one or more epoxy curing agents, wherein said epoxy curing agent is selected from the group consisting of polybasic carboxylic acids and their anhydrides; aliphatic, cycloaliphatic, and aromatic amines; carboxylic acid amides; and melamines; said epoxy resin composition being free of fluorene-containing amine curing agents.

4,882,371

DURABLE EPOXY RESIN PAINT COMPOSITION

Yasushi Matsubara; Minoru Miyagawa, and Masanori Takahashi, all of Miyagi, Japan, assignors to Tohoku Dotetsu Kabushiki Kaisha, Miyagi, Japan

Filed Aug. 4, 1987, Ser. No. 81,327
Claims priority, application Japan, Nov. 12, 1986, 61-267688; Nov. 12, 1986, 61-267689
Int. Cl.[4] C08K 3/20
U.S. Cl. 523—406 5 Claims

1. A durable epoxy resin paint composition comprising from 0.5 to 10% of a vinylidene chloride-based resin emulsion and from 99.5 to 90% of an epoxy resin paint.

4,882,372

WATER-DISPERSED EPOXY/ACRYLIC COATINGS FOR PLASTIC SUBSTRATES

James T. K. Woo, Medina, and Richard M. Marcinko, North Royalton, both of Ohio, assignors to The Glidden Company, Cleveland, Ohio

Filed Aug. 8, 1988, Ser. No. 229,461
Int. Cl.[4] C08L 63/00, 33/14
U.S. Cl. 523—411 3 Claims

1. A water dispersed, ambient curable paint coating composition to be applied, the paint coating composition containing a thermosetting polymeric binder comprising on a polymer weight basis:

between 20% and 99% acrylic copolymer of copolymerized ethylenically unsaturated monomers comprising by weight 50% and 90% acrylic monomer, between 1% and 25% carboxyl functional monomer, between 1% and 30% of tertiary amine functional monomer, with the balance being other ethylenically unsaturated monomer, where said acrylic copolymer is self-neutralizing and dispersible into water due to the tertiary amino functional groups of the copolymerized tertiary amine functional monomer;

between 1% and 80% epoxy resin comprising the coreaction product of three to five molecules of epichlorohydrin reacted with one molecule of sorbitol, where said epoxy resin is adapted to crosslink with said acrylic copolymer upon curing, said epoxy resin coreacted with sufficient alkanolamine compound to render the epoxy resin water dispersible;

where said acrylic copolymer and said epoxy resin are dispersed into water; and

to a plastic substrate and said polymer binder is thermosetting at ambient temperatures.

4,882,373

ASPHALTIC COMPOSITION

Lyle E. Moran, Sarnia, Canada, assignor to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 77,379, Jul. 24, 1987, abandoned. This application Aug. 15, 1988, Ser. No. 232,210
Int. Cl.[4] C08K 3/24; C08L 53/02, 95/00
U.S. Cl. 524—68 36 Claims

1. An asphaltic composition having improved tensile properties that is produced by the method comprising:

(a) contacting asphalt with from about 0.25 to about 4 wt. % of a mineral acid to form an acid modified asphalt,

(b) contacting said acid modified asphalt with an oxygen-containing gas to form an acid/oxygen modified asphalt, the temperature of the asphalt during said contacting in (a) and (b) being maintained between about 200° C. and about 300° C.,

(c) contacting said acid/oxygen modified asphalt with from about 5 to about 25 wt. % of a thermoplastic elastomer at a temperature between about 160° C. to form a polymer modified asphalt, and

(d) contacting said polymer modified asphalt with from about 0.3 to about 15 wt. % of an unsaturated functional monomer selected from the group consisting of an unsaturated carboxylic acid, an unsaturated dicarboxylic acid, an unsaturated anhydride, an unsaturated ester, an unsaturated imide and mixtures thereof at a temperature above about 120° C. but not more than about 200° C.

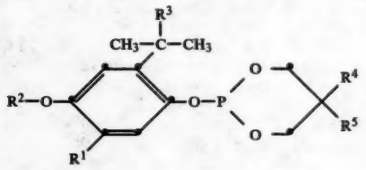
4,882,374

DIOXAPHOSPHORINANE COMPOUNDS AND POLYOLEFIN COMPOSITIONS SABILIZED THEREWITH

Richard H. S. Wang, and Garry L. Myers, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 6, 1989, Ser. No. 306,130
Int. Cl.[4] C08K 5/49
U.S. Cl. 524—117 6 Claims

1. A stabilized composition comprising a poly-α-olefin susceptible to degradation upon exposure to heat and/or radiation containing a stabilizing amount of a compound having the formula



wherein

R^1 is hydrogen, alkyl or aralkyl;

R^2 is hydrogen or alkyl;

R^3 is alkyl or aryl; and

R^4 and R^5 each is alkyl.

4,882,375

POLYESTERS WITH MODIFIED MELT VISCOSITY

John A. Tyrell, Dalton, Mass., and Lawrence R. Wallace, Evansville, Ill., assignors to General Electric Company, Mt. Vernon, Ind.

Filed Sep. 1, 1988, Ser. No. 239,601
Int. Cl.[4] C08L 67/02
U.S. Cl. 524—161 12 Claims

1. A polyester compostion comprising a polyester resin and a melt viscosity lowering amount of a sulfonate salt of a carboxylic acid which has the formula $R(COOH)_x$, wherein R is an alkyl group having from about 1 to about 20 carbon atoms or an aryl group, and x is 1 or 2.

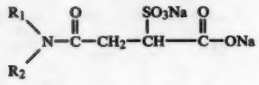
4,882,376

PLASTISOLS BASED ON VINYL CHLORIDE POLYMERS, AND USE OF PLASTISOLS FOR COATING SHEET METAL

Serge Dusoleil, Brussels; Jean-Luc Preat, Grimbergen, and Odon Barthelemy, Brussels, all of Belgium, assignors to Solvay & Cie, Belgium

Continuation of Ser. No. 146,105, Jan. 20, 1988, abandoned. This application Apr. 18, 1989, Ser. No. 339,880
Claims priority, application France, Jan. 22, 1987, 8700836
Int. Cl.[4] C08K 5/42
U.S. Cl. 524—166 6 Claims

1. Plastisols based on vinyl chloride polymers, comprising vinyl chloride polymers resulting from the polymerization of vinyl chloride in aqueous medium with the aid of a sodium sulphosuccinamate of general formula:



(I)

in which:

R_1 denotes a C_{16}–C_{20} alkyl radical and R_2 denotes a sodium 1,2-dicarboxyethyl radical.

4,882,377

LOW-VISCOSITY PRESSURE-ADHERENT SILICONE ELASTOMER COMPOSITIONS

Randall P. Sweet; Patrick J. Miller, both of Midland, Mich., and Virgil L. Metevia, Chino, Calif., assignors to Dow Corning Corporation, Midland, Mich.

Filed Sep. 21, 1988, Ser. No. 247,184
Int. Cl.[4] C08K *5/54*
U.S. Cl. 524—267 **18 Claims**

1. A pressure-adherent silicone elastomer composition comprising a homogeneous mixture of:

(I) a silicone pressure sensitive adhesive composition employed in an amount from about 15 to about 90 parts by weight, said silicone pressure sensitive adhesive composition comprising a homogeneous mixture of

(A) from about 35 to about 70 parts by weight of at least one benzene-soluble resinous copolymer containing silicon-bonded hydroxyl radicals and consisting essentially of triorganosiloxy units of the formula $R_3SiO_{\frac{1}{2}}$ and tetrafunctionalsiloxy units of the formula $SiO_{4/2}$ in a ratio of about 0.6 to 0.9 triorganosiloxy units for each tetrafunctionalsiloxy unit present in the copolymer and

(B) from about 30 to about 65 parts by weight of at least one polydiorganosiloxane consisting essentially of ARSiO units terminated with endblocking $TRASiO_{\frac{1}{2}}$ units, each said polydiorganosiloxane having a viscosity of from about 100 centipoise to about 50,000 centipoise at 25° C. where each T is —OH or —OR',

where each R is a monovalent hydrocarbon radical having from 1 to 6 inclusive carbon atoms, each R' is an alkyl radical of from 1 to 4 inclusive carbon atoms, and each A radical is selected from the group consisting of R and halohydrocarbon radicals of from 1 to 6 inclusive carbon atoms,

said silicone pressure sensitive adhesive composition having been reaction-condensed to a plasticity of not more than about 200 mils at 23° C. as measured after force is applied on a specimen weighing twice the specific gravity of the silicone pressure sensitive adhesive composition for 3 minutes ±5 seconds,

(II) a non-reacted crosslinkable silicone elastomer composition which is curable by a chemistry which does not cure said silicone pressure sensitive adhesive composition (I) to the point of eliminating tack or adhesive properties employed in an amount from about 10 to about 85 parts by weight, the total of silicone pressure sensitive adhesive composition (I) and crosslinkable silicone elastomer composition (II) being 100 parts by weight, and

(III) a non-volatile, nonflammable, compatible viscosity reducing agent for reducing the viscosity of said pressure-adherent silicone elastomer composition employed in an amount from 0 to about 40 weight percent based on the total weight of the silicone pressure sensitive adhesive composition (I) and the crosslinkable silicone elastomer composition (II), said viscosity reducing agent being generally nonreactive with said silicone pressure sensitive adhesive composition (I) and said crosslinkable silicone elastomer composition (II).

4,882,378

HIGH PERFORMANCE RUBBER COMPOSITIONS

Glenn R. Himes, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 676,708, Nov. 30, 1989, abandoned.
This application Jul. 21, 1988, Ser. No. 222,385
Int. Cl.[4] C08K *3/36*; C08L *53/02*
U.S. Cl. 524—505 **12 Claims**

1. A polymeric composition having high abrasion resistance and freedom from weld lines in molded unit soles, said composition comprising:

(a) 100 parts by weight of a block copolymer portion comprising

(1) about 10% to 90% of one or more radial $(AB-)_x$-BA block copolymers where x is between 1 and 20, each block A being a monoalkenyl arene polymer having an average molecular weight between about 5,000 and 75,000, each block B being an elastomeric conjugated diene polymer having an average molecular weight between about 15,000 and about 300,000, and said blocks A comprise 8–50% by weight of each copolymer;

(2) about 10% to 90% by weight of one or more radial $(CD-)_yDC$ block copolymers where y is between 1 and 20, each block C being a monoalkenyl arene polymer having an average molecular weight between about 5,000 and 75,000, each block D being an elastomeric conjugated diene polymer having an average molecular weight between about 8,000 and about 60,000, and said blocks C comprise 60–90% by weight of each copolymer,

(b) about 5 to about 200 parts by weight of a dyndiotactic 1,2-polybutadiene;

(c) about 9 to 50 parts by weight of a linear low density polyethylene;

(d) about 0 to about 200 parts byweight of a hydrocarbon rubber extending oil; and

(e) about 10 to about 50 parts by weight of a large agglomerate size filler.

4,882,379

ADHERABLE POLYESTER FILM

Richard P. Pankratz, Circleville, Ohio, assignor to E.I. Du Pont De Nemours and Company, Wilmington, Del.

Filed Jun. 14, 1988, Ser. No. 206,432
Int. Cl.[4] C08G *18/83*
U.S. Cl. 524—590 **6 Claims**

1. A process for preparing an aqueous, film-forming coating emulsion of a carboxyl group-containing polyurethane composition consisting essentially of a polymer of at least one diol, the total amount of the diol component being 50 mole %, and 50 mole % of at least one diisocyanate, the polymer being modified by esterifying the terminal hydroxyl groups and amidizing any terminal amine groups of the polymer by treatment with the anhydride of a dicarboxylic acid, thus providing carboxyl groups, the acid number of the carboxyl group-containing polyurethane being about 3–20;

said process comprising the following sequential steps:

(a) dissolving the carboxyl group-containing polyurethane in an organic solvent selected from the group consisting of tetrahydrofuran and mixtures of tetrahydrofuran with at least one other organic cosolvent selected from the group consisting of methanol, acetone, dioxane, dimethoxyethane, and methyl ethyl ketone, the amount of cosolvent other than methyl ethyl ketone or total amount of such cosolvents being at most about 25 weight % of the solvent mixture, and the amount of methyl ethyl ketone being at most about 75 weight % of the solvent mixture, the balance in each case being tetrahydrofuran;

(b) neutralizing the carboxylic groups with an inorganic base, ammonia, or an organic amine;

(c) adding a sufficient amount of water with good agitation to cause emulsification; and

(d) evaporating the organic solvent.

4,882,380

PROCESS FOR THE PRODUCTION OF IMPACT POLYPROPYLENE COPOLYMERS

Harold K. Ficker, Wayne, N.J., and William G. Sheard, South Charleston, W. Va., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Jul. 7, 1987, Ser. No. 70,573

Int. Cl.[4] C08F *297/08*

U.S. Cl. 525—53 **12 Claims**

1. A process for the production of a product comprising ethylene/propylene copolymer incorporated into a matrix of propylene homopolymer or copolymer comprising the following steps carried out in the gas phase:

(a) contacting propylene or propylene and at least one alpha-olefin having 2 to 8 carbon atoms, and hydrogen, wherein the alpha-olefin is present in a ratio of about 0.01 to about 0.06 mole of alpha-olefin per mole of propylene and the hydrogen is present in a ratio of about 0.001 to about 0.45 mole of hydrogen per mole of combined propylene and alpha-olefin, with a catalyst comprising (i) a catalyst precursor, which includes titanium, magnesium, chlorine, and an electron donor; (ii) a hydrocarbyaluminum cocatalyst; and (iii) a selectivity control agent, which is different from the electron donor, in a first reactor in such a manner that a mixture of a homopolymer of propylene or a copolymer of propylene and alpha-olefin together with active catalyst is produced;

(b) passing the mixture from step (a) into a second reactor; and

(c) adding to the second reactor:

(i) a sufficient amount of ethylene and propylene to provide ethylene/propylene copolymer in an amount of about 20 percent to about 45 percent by weight, based on the weight of the product, said ethylene and propylene being introduced in a ratio of about 10 to about 50 moles of ethylene per mole of propylene; and

(ii) hydrogen in a mole ratio of about 0.1 to about 1.0 mole of hydrogen per mole of combined ethylene and propylene; and

(d) effecting the copolymerization of ethylene and propylene in the second reactor in such a manner that the product is produced.

4,882,381

MOULDING COMPOUNDS OF AROMATIC POLYESTERS AND GRAFTED SILICONE RUBBER

Dieter Wittmann, Krefeld, Fed. Rep. of Germany; Hans-Jürgen Kress, Pittsburgh, Pa.; Ludwig Bottenbruch, Krefeld, Fed. Rep. of Germany; Edgar Leitz, Dormagen, Fed. Rep. of Germany, and Horst Peters, Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 26, 1988, Ser. No. 224,299

Claims priority, application Fed. Rep. of Germany, Aug. 1, 1987, 3725576

Int. Cl.[4] C08L *51/08*

U.S. Cl. 525—63 **10 Claims**

1. Thermoplastic moulding compounds based on:

A. from 5 to 99% by weight, based on the total weight of A and B, of an aromatic polyester, an aromatic polyester carbonate or a mixture thereof

B. from 1 to 95% by weight, based on the total weight of A and B, of a graft polymer of:

B.1 from 5 to 90 parts by weight of a mixture of

B.1.1 from 50 to 90 parts by weight of styrene, α-methylstyrene, styrene substituted with halogen or methyl in the ring, methylmethacrylate or mixture of these compounds and

B1.2 from 5 to 50 parts by weight of acrylonitrile, methacrylonitrile methylmethacry-late, maleic acid anhydride, C_1–C_4-alkyl-substituted or phenyl-N-substituted maleimide or mixtures of these compounds on

B.2 from 10 to 95 parts by weight of a silicone rubber having an average particle diameter d_{50} of from 0.09 to 1 m and a gel content of more than 50% by weight, based on B.2.

4,882,382

RUBBER MODIFIED REACTION MOLDED NYLON-6 BLOCK COPOLYMERS

Kishore Udipi, Longmeadow, Mass., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 808,782, Dec. 13, 1985, abandoned, which is a continuation-in-part of Ser. No. 808,790, Dec. 13, 1985, abandoned. This application Jun. 2, 1987, Ser. No. 57,583

Claims priority, application Canada, Dec. 12, 1986, 525170; European Pat. Off., Dec. 12, 1986, 86870 186.3; Japan, Dec. 12, 1986, 61-295063

Int. Cl.[4] C08L *77/00*

U.S. Cl. 525—66 **3 Claims**

1. A process for the preparation of a substantially colloidal dispersion of a core-shell polymer in a solution of caprolactam containing a telechelic polymer the individual molecules of which are capped with at least two lactam polymerization initiator groups or precursors of lactam polymerization initiator groups, said process comprising

(A) adding an aqueous dispersion of a core-shell polymer to an aqueous solution of caprolactam to provide a dispersion of core-shell polymer in an aqueous solution of caprolactam, wherein said polymer comprises an elastomeric core and a rigid thermoplastic polymer shell,

(B) evaporating water from the dispersion to provide a dispersion of core-shell polymer in caprolactam, and

(C) adding to the dispersion of core-shell polymer in caprolactam (i) telechelic polymer the individual molecules of which are capped with at least two lactam polymerization initiator groups or precursors of lactam polymerization initiator groups, or (ii) telechelic polymer precursor consisting of polyol and lactam polymerization initiator.

4,882,383

IMPACT MODIFIED POLY(ALKENYL AROMATIC) RESIN COMPOSITIONS

Sai-Pei Ting, New York, N.Y., assignor to General Electric Co., Selkirk, N.Y.

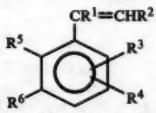
Filed Jul. 21, 1987, Ser. No. 76,118

Int. Cl.[4] C08L *9/00, 13/00, 25/00, 51/04*

U.S. Cl. 525—71 **20 Claims**

1. A thermoplastic resin composition comprising:

(a) a base resin comprising a poly(alkenyl aromatic) resin combined with or grafted with natural rubber or synthetic rubber selected from diene rubber or acrylic rubber, comprising units of the formula



wherein R^1 and R^2 are selected from lower alkyl or alkenyl groups having from 1 to 6 carbon atoms or hydrogen; R^3 and R^4 are selected from chloro, bromo, hydrogen or lower alkyl of from 1 to 6 carbon atoms; R^5 and R^6 are selected from hydrogen, lower alkyl or alkenyl groups of from 1 to 6 carbon atoms, or R^5 and R^6 may be concatenated together with hydrocarbyl groups to form a naphthyl group; and

(b) from about 1 to about 40 parts by weight of a modifying agent comprised of a crosslinked (meth)acrylate core and an interpenetrating crosslinked polyalkenyl aromatic resin shell per 100 parts of the base resin.

4,882,384

MODIFIED BLOCK COPOLYMERS

Carl L. Willis, and Steven S. Chin, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Feb. 1, 1988, Ser. No. 150,579
Int. Cl.[4] C08F 8/42; C08L 53/02
U.S. Cl. 525—105 20 Claims

1. A functionalized, selectively hydrogenated block copolymer said copolymer comprising:

(a) at least one alkenyl arene polymer block A and

(b) at least one substantially completely hydrogenated conjugated diene polymer block B,

(c) wherein silicon or boron containing compounds containing at least one moisture curing functional group are grafted to said copolymer substantially on said A blocks.

4,882,385

1,3,5-TRIS(1-ISOCYANATOMETHYLETHYL)BENZENE IN POLYURETHANES

Singh Balwant, and Peter S. Forgione, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 453,681, Dec. 27, 1982, Pat. No. 4,633,010. This application Sep. 19, 1986, Ser. No. 909,372
Int. Cl.[4] C08G 18/62; C08F 20/00
U.S. Cl. 525—123 3 Claims

1. A coating composition comprising a resin having free hydroxyl functionality and a cross-linkingly effective amount of 1,3,5-tris(1-isocyanate-1-methyl-ethyl)benzene.

4,882,386

CURABLE RUBBER COMPOSITION

Giandomenico Stella, Brussels, Belgium, assignor to Exxon Chemical Patents Inc., Linden, N.J.

Filed Nov. 20, 1987, Ser. No. 123,329
Claims priority, application United Kingdom, Nov. 21, 1986, 8627905
Int. Cl.[4] C08L 61/10
U.S. Cl. 525—133 15 Claims

1. A curable rubber composition which in the cured state has improved adhesion to substrates through hydroxyl-reactive adhesives which composition comprises a blend of

(a) a first elastomer having generally poor adhesion to such adhesives and comprising a copolymer of ethylene with at least one alpha-olefin and optionally a minor proportion of at least one copolymerisable polyene;

(b) a second elastomer being a halogenated elastomeric polymer which is covulcanisable with the first elastomer and comprising a minor proportion of the combined weight of said first and second elastomers;

(c) a phenol resin;

(d) a curative system for said first and seocnd elastomers; and

(e) an aminic substance capable of catalysing reaction between the phenolic groups of the phenol resin and isocyanate containing adhesives wherein said aminic substance is selected from those substances having high amine basicity and low steric hindrance of the amine moiety.

4,882,387

CO-CURING OF NR/EPDM RUBBER BANDS

Singa D. Tobing, 1212 Seventh St., Moline, Ill. 61265

Filed May 13, 1988, Ser. No. 193,803
Int. Cl.[4] C08L 7/00, 23/16, 23/20, 7/00
U.S. Cl. 525—194 2 Claims

1. The method of co-vulcanizing an NR/EPDM blend comprising uniformly dispersing EPDM into NR in a range of proportions of about 70–55 parts NR to about 30–45 parts EPDM, said EPDM being divided between high molecular weight (MW) EPDM and low molecular weight (MW) EPDM in the range of about 32–20 parts high MW and about 4–10 parts low MW EPDM, said high MW being defined as having an Mn>50,000 and said low MW being defined as having an Mn between 1,000 and 15,000; blending in a curing system containing 0.64–1.6 phr of sulfur, 0.6–1.2 phr of organic peroxide, 0.5–1.0 phr of mercaptobenzothiasole and 0.3–0.6 phr of diphenylguanidine; and curing the rubber blend with the curing system in an air environment in an autoclave.

4,882,388

RUBBER COMPOSITION

Takashi Nakagawa; Sigelu Yagisita, both of Yokohama, and Masahiro Fukuyama, Chiba, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Oct. 5, 1988, Ser. No. 253,465
Claims priority, application Japan, Oct. 5, 1987, 62-249753
Int. Cl.[4] C08L 37/00, 33/06, 33/14, 23/08
U.S. Cl. 525—208 16 Claims

1. A rubber composition comprising a rubber component composed of an ethylenic copolymer rubber and an acrylic rubber, wherein said ethylenic copolymer rubber is a copolymer comprising (a) 50 to 85% by mole of ethylene, (b) 50 to 15% by mole of an acrylate and/or a methacrylate, and (c) 0.05 to 8% by mole, based on the total of said components (a) and (b), of a cross-linked point forming monomer; and said acrylic rubber contains at least 60% by mole of at least one monomer selected from among at least an alkyl acrylate, an alkyl methacrylate, and an alkoxyalkyl acrylate.

4,882,389

ELECTRICAL INSULATING RESIN

Makoto Doi; Hiroyukio Nakajima; Fumiyuki Miyamoto; Seiji Oka, and Mitsuhiro Nonogaki, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 18, 1987, Ser. No. 135,078
Claims priority, application Japan, Jan. 12, 1987, 62-4281; Jan. 12, 1987, 62-4282
Int. Cl.[4] C08F 279/02, 265/06
U.S. Cl. 525—310 5 Claims

1. A resin obtained by heat-curing 100 parts by weight of a butadiene polymer containing in its polymer chain at least 50 mol% of 1,2-butadiene units having a double bond in each unit in its side chain and from 10 to 100 parts by weight of a vinyl compound having at least 3 vinyl groups per molecule selected from the group consisting of trimethylolpropane triacrylate, trimethylolpropane trimethacrylate, triallyltrimellitate, trihydroxyethylisocyanuric acid triacrylate and trihydroxyethylisocyanuric acid trimethacrylate in the presence of an organic peroxide.

4,882,390

FLUOROELASTOMER COMPOSITION WITH ORGANO-ONIUM COMPOUNDS

Robert E. Kolb, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 176,410, Apr. 1, 1988, abandoned. This application Feb. 15, 1989, Ser. No. 311,135
Int. Cl.[4] C08F 8/00
U.S. Cl. 525—326.3 29 Claims

1. An elastomeric composition comprising saturated elastomer gum consisting essentially of repeating interpolymerized units derived from vinylidene fluoride, tetrafluoroethylene, and copolymerizable hydrocarbon olefin, and the combination of

(A) 0.3 to 10 millimoles of polyhydroxy compound per one hundred grams of said gum, and

(B) 0.2 to 10 millimoles of organo-onium compound per one hundred grams of said gum, except when said gum is derived from vinylidene fluoride, tetrafluoroethylene and propylene, and said polyhydroxy compound is hexafluoroisopropylidene-bis-(4-hydroxybenzene), and said organo-onium is a phosphonium compound, then said organo-onium compound is other than benzyltriphenylphosphonium chloride.

4,882,391

POLYMERS CONTAINING AMINO GROUPS, THEIR PREPARATION AND THEIR USE

Gerhard Brindöpke, Frankfurt am Main, and Michael Hönel, Mainz, both of Fed. Rep. of Germany, assignors to Hoechst AG, Fed. Rep. of Germany

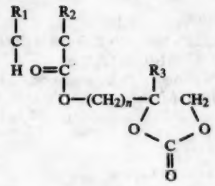
Filed Dec. 22, 1987, Ser. No. 136,870

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1986, 3644373

Int. Cl.[4] C08F *8/32*

U.S. Cl. 525—327.2 11 Claims

1. A non-crosslinked reaction product of a compound (A) derived from ethylenically unsaturated monomers which contains in random distribution structural units (a) carrying 1,3-dioxolan-2-one groups of the formula I



I

in which n is a number from 1 to 6, R_1 is H, alkyl or COOR" (R"=alkyl), and R_2 is, independently thereof, H or alkyl and R_3 is H, methyl or ethyl and a compound (B) having at least one primary aliphatic or cycloaliphatic amino group and additionally, at least one further basic amino group, the amine numbers of the reaction product being between 1 and 120 and the molecular weight Mw is 1,000 to 50,000.

4,882,392

NOVEL RADIOPAQUE HEAVY METAL POLYMER COMPLEXES, COMPOSITIONS OF MATTER AND ARTICLES PREPARED THEREFROM

Johannes Smid, Lafayette; Israel Cabasso; Alan Obligin, both of Syracuse, all of N.Y., and H. Ralph Rawls, Boston, Mass., assignors to The Research Foundation of State University of New York, Albany, N.Y.

Continuation of Ser. No. 916,182, Oct. 7, 1986, abandoned. This application Nov. 18, 1988, Ser. No. 273,662

Int. Cl.[4] C08F *16/36*

U.S. Cl. 525—328.6 21 Claims

1. A composition comprising a radiopaque polymer, said polymer derived from a heavy metal Lewis acid radiopacifying salt and at least one Lewis base monomer selected from the group consisting of alkyl and vinyl alkyl ketones, alkyl and aryl esters of unsaturated carboxylic acids, invyl esters of carboxylic acids, celulose esters of carboxylic acids, linear and crosslinked polyesters, said salt being molecularly bound to said polymer to form a clear, homogeneous, substantially nonleachable material, said composition being subsantially free of unbound radiopacifying salt.

4,882,393

IONOMER-MODIFIED POLYETHYLENE AS FILM MATERIAL

Jens Herwig, Cologne; Alois Kolwert, Roesrath; Hubert Sutter, Leverkusen, and Dieter Woltjes, Dormagen, all of Fed. Rep. of Germany, assignors to EC Erdoelchemie GmbH, Cologne, Fed. Rep. of Germany

Continuation of Ser. No. 927,906, Nov. 6, 1986, abandoned. This application Aug. 10, 1988, Ser. No. 230,559

Claims priority, application Fed. Rep. of Germany, Nov. 21, 1985, 3541096; Jun. 13, 1986, 3620034; Sep. 12, 1986, 3631005

Int. Cl.[4] C08F *8/42*

U.S. Cl. 525—330.2 3 Claims

1. A film material prepared from a low density polyethylene (LDPE) which is an ionomer-modified copolymer wherein 30–95% of the carboxyl groups present in the copolymer are neutralized, and the neutralized carboxyl groups represent 0.1–0.6 mol %, of the total number of moles of all monomers in the copolymer said copolymer being an ethylene/carboxylic acid copolymer and wherein the copolymer contains acrylic acid or methacrylic acid as comonomers and wherein the cations of the metals sodium, zinc or magnesium are present in the copolymer.

4,882,394

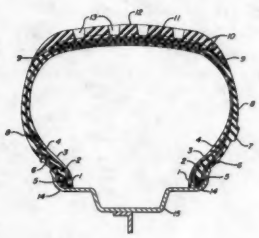
METHOD FOR IMPROVING RUBBER CURE RATES

James G. Kreiner, Silver Lake, Ohio, assignor to General Tire, Inc., Akron, Ohio

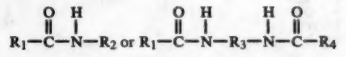
Filed Sep. 8, 1987, Ser. No. 93,852

Int. Cl.[4] C08C *19/20*

U.S. Cl. 525—332.7 8 Claims



1. A vulcanizable compounded rubber composition where the rubber of said composition comprises at least one rubber selected from the group consisting of natural rubber and solution or emulsion polymerized rubbers and contains as the vulcanizing agents sulfur in an amount of from about 2.0 to 5.0 phr (parts by weight per 100 parts of rubber in the composition), zinc oxide in an amount of about 5.0 phr, a sulfenamide accelerator in an amount of from about 0.5 to 1.5 phr and an amide having the formula:



where R_1, R_3 and R_4 are linear, branched or cyclic C_1 to C_{25} saturated or unsaturated, aliphatic, hydrocarbon radicals and where R_2 is hydrogen or a linear, branched or cyclic C_1 to C_{25} saturated or unsaturated, aliphatic hydrocarbon radical and mixtures of the same, said amide being in an amount of from about 0.5 to 5.0 phr.

4,882,395

BRANCHED HYDROXY-TERMINATED ALIPHATIC POLYETHERS

Elie Ahad, Ste-Foy, Canada, assignor to Her Majesty the Queen in right of Canada, as represented by Minister of National Defence of Her Majesty's Canadian Government, Ottawa, Canada

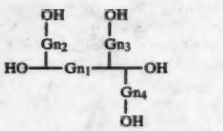
Filed Oct. 20, 1988, Ser. No. 260,113

Claims priority, application Canada, Jul. 4, 1988, 571721

Int. Cl.[4] C08G *65/24, 65/32*

U.S. Cl. 525—407 41 Claims

1. A process for the preparation of branched hydroxy-terminated aliphatic polyethers having alkyl azide substituents, having a structural formula



G = GAP unit ($-CH_2-CH(CH_2N_3)-O-$)

n_1 = number of GAP units in segment 1
n_2 = number of GAP units in segment 2
n_s = number of GAP units in segment s
s = total number of segments in the molecule
n = total degree of polymerization (total number of GAP units)

$$n = (n_1 + n_2 + n_3 + n_4 \ldots + n_s) = \sum_{i=1}^{s}$$

$5 \leq n \leq 400$,

and a molecular weight of 500 to 40,000, comprising the single step of reacting a solid rubbery polyepichlorohydrin (PECH) of molecular weight of about $0.5\text{–}5.0 \times 10^6$ with epichlorohydrin and an ionic azide selected from the group consisting of sodium azide, potassium azide and lithium azide, in a suitable organic solvent at elevated temperature, while agitating.

4,882,396

SILOXANE-AMIDE BLOCK COPOLYMER AND PROCESS FOR PRODUCING THE SAME

Hisayuki Nagaoka, and Michio Zenbayashi, both of Gunma, Japan, assignors to Toshiba Silicone Co., Ltd., Tokyo, Japan

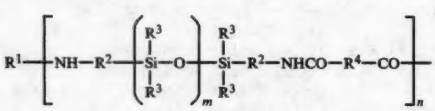
Filed Aug. 5, 1988, Ser. No. 228,642

Claims priority, application Japan, Aug. 7, 1987, 62-197505; Oct. 7, 1987, 62-253395

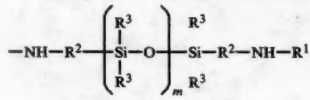
Int. Cl.[4] C08F *283/04*

U.S. Cl. 525—426 **9 Claims**

1. A siloxane-amide block copolymer having an alkenyl group or a photopolymerizable organic group at both terminals thereof which is represented by formula (I):



(I)



wherein R^1 represents a reaction residual group of an epoxy compound containing a photopolymerizable organic group formed by a ring-opening addition reaction between the amino group at both terminals of the block copolymer and the epoxy group of the epoxy compound and/or a substitution reaction product between said reaction residual group of the block copolymer and a silylating agent; R^2represents a substituted or unsubstituted divalent hydrocarbon group; R^3 represents a substituted or unsubstituted monovalent hydrocarbon group; R^4 represents a substituted or unsubstituted divalent aromatic hydrocarbon group; and m and n each represents a number of 1 or more.

4,882,397

METHOD FOR CONVERTING POLYKETALS TO POLYARYLETHERKETONES IN THE PRESENCE OF A METAL SALT

Donald R. Kelsey, Houston, Tex., assignor to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 938,424, Dec. 5, 1986, abandoned. This application Feb. 17, 1988, Ser. No. 156,844

Int. Cl.[4] C08G *2/30, 65/32*

U.S. Cl. 525—471 **17 Claims**

1. A process for preparing a polyaryletherketone which comprises converting a polyketal to the corresponding polyaryletherketone in the presence of a catalyst comprising one or more of a Group IIA, IIB, IVA, VIIB, IIIA, IVB, IB or VIII metal salt.

4,882,398

OPTICALLY CLEAR REINFORCED ORGANOSILOXANE COMPOSITIONS

Godfrey C. Mbah, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Aug. 26, 1988, Ser. No. 236,862

Int. Cl.[4] C08F *283/00*

U.S. Cl. 525—478 **6 Claims**

1. In a curable composition comprising
(1) a diorganovinylsiloxy-terminated polydiorganosiloxane,
(2) an amount of a resinous organosiloxane copolymer sufficient to improve the physical properties of the elastomer obtained by curing said composition.
(3) an amount of an organohydrogensiloxane sufficient to cure said composition, and
(4) an amount of a platinum-containing hydrosilation catalyst sufficient to promote curing of said composition.
the improvement comprising (a) selecting said polydiorganosiloxane from those exhibiting a viscosity of at least 12 Pa.s at 25 degrees C. and wherein at least 95% of the repeating units are dimethylsiloxane units and any remainder are diorganosiloxane units wherein the organic groups bonded to silicon are monovalent hydrocarbon radicals or monovalent halogenated hydrocarbon radicals (b) selecting said organosiloxane copolymer from those consisting essentially of SiO_2, trimethylsiloxy and dimethylvinylsiloxy units, where the molar ratio of the combination of trimethylsiloxy and dimethylvinylsiloxy units to SiO_2 units is from 0.6 to 1.1, inclusive and said copolymer contains from 1.5 to 3.5 weight percent of vinyl radicals, and (c) maintaining the concentration of said organosiloxane copolymer within the range of from 1 to about 45 weight %, based on the weight of said polydiorganosiloxane to achieve a reduction in the viscosity of said composition relative to the viscosity of the composition in the absence of said copolymer.

4,882,399

EPOXY RESINS HAVING REVERSIBLE CROSSLINKS

Giuliana C. Tesoro, Dobbs Ferry, and Vinod R. Sastri, Brooklyn, both of N.Y., assignors to Polytechnic University, Brooklyn, N.Y.

Filed Aug. 21, 1987, Ser. No. 88,179

Int. Cl.[4] C08G *59/50*

U.S. Cl. 525—523 **56 Claims**

1. A method for the preparation of insoluble, infusible epoxy resins containing reversible crosslinks comprising the steps of:
(a) forming a reaction mixture of
(i) an epoxy compound having two or more epoxy groups, and
(ii) a crosslinking agent containing two or more epoxy-reactive groups and further containing a single disulfide bond, and
(b) curing said reaction mixture under conditions conducive to the formation of a crosslinked resin.

2. A method for the preparation of insoluble, infusible epoxy resins containing reversible crosslinks comprising the steps of:
(a) forming a reaction mixture of

(i) an epoxy compound having two or more epoxy groups, and

(ii) a crosslinking agent containing two or more epoxy-reactive groups and further containing a disulfide bond, said crosslinking agent being selected from compounds having the formula

Q—X—S—S—X—Q

where Q is an epoxy-reactive functional group selected from

$-NH_2$, $-\overset{\overset{O}{\|}}{C}NHNH_2$ and $-NCO$,

and X is a divalent aromatic or aliphatic hydrocarbon radical of one to ten carbon atoms, and

(b) curing said reaction mixture under conditions conducive to the formation of a crosslinked resin.

13. A method for the preparation of insoluble, infusible epoxy resins containing reversible crosslinks and for the recovery of soluble polymers therefrom comprising the steps of:

(a) forming a reaction mixture of

(i) an epoxy compound having two or more epoxy groups, and

(ii) a crosslinking agent containing two or more epoxy-reactive groups and further containing a disulfide bond,

(b) curing said reaction mixture under conditions conducive to the formation of a crosslinked resin, and

(c) cleaving the disulfide bonds in said resin by reducing said resin in the presence of solvent and a reducing agent and thereby forming a soluble polymer.

4,882,400

PROCESS FOR GAS PHASE POLYMERIZATION OF OLEFINS IN A FLUIDIZED BED REACTOR

Andre Dumain, Martigues, and Charles Raufast, Saint Julien Les Martigues, both of France, assignors to BP Chemicals Limited, London, England

Filed Jul. 27, 1988, Ser. No. 224,997

Claims priority, application France, Jul. 31, 1987, 87 11036

Int. Cl.[4] C08F *2/34*

U.S. Cl. 526—88 9 Claims

1. A process for gas phase polymerization of one or more olefins of formula CH2=CH—R in which R is hydrogen atom or an alkyl radical containing from 1 to 6 carbon atoms, in the presence of a solid catalyst based on chromium oxide, activated by heat treatment, or of a catalyst system of the Ziegler-Natta type comprising a solid catalyst consisting essentially of atoms of magnesium, of halogen and of at least one transition metal belonging to groups IV, V or VI of the Periodic Classification of the elements and a cocatalyst based on an organometallic compound of a metal belonging to groups II or III of this Classification, in which process a rising stream of a gas mixture containing the olefin(s) to be polymerized keeps the polyolefin particles being formed in the fluidized state in a fluidized bed reactor (1) comprising an upright reactor body (2) partially occupied by the fluidized bed and mounted under a disengagement chamber (3) of larger cross-sectional area than that of the reactor body (2), from which disengagement chamber there leaves a gas mixture entraining solid particles which are separated from the gas mixture in a dust separator and are reintroduced into the reactor body (2), the gas mixture being then cooled, compressed and recycled to the base of the reactor, and forming the recycle gas, the solid particles separated from the major part of the gas mixture leaving the reactor are put into contact with a carrier gas in a mixing device and are reintroduced mixed with this carrier gas into the reactor body, the process being characterized in that the particles mixed with the carrier gas are introduced into the reactor body through an opening in the side wall thereof at a position above the fluidized bed, but below the disengagement chamber and in that the velocity of the particles introduced into the reactor body is insufficient to cause them to be blown directly into the bed.

4,882,401

SLOW GEL/CURE SYSTEMS BASED ON DIALKYLZINC FOR DICYCLOPENTADIENE POLYMERIZATION

Andrew Bell, New Castle, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Sep. 28, 1988, Ser. No. 250,209

Int. Cl.[4] C08F *4/50, 32/00, 36/00*

U.S. Cl. 526—119 10 Claims

1. In a process for preparing molded objects wherein a liquid reaction mass comprised of a metathesis polymerizable cycloolefin, a metatheis polymerization catalyst, a catalyst activator and a reaction rate moderator are charged to a mold wherein polymerization will take place, the improvement wherein said catalyst activator is selected from the group consisting of dialkylzinc, alkylzinc halide and aromatic zinc compounds.

4,882,402

SIDE CHAIN LIQUID CRYSTALLINE POLYMERIC MEDIA EXHIBITING THIRD ORDER NONLINEAR OPTICAL RESPONSE

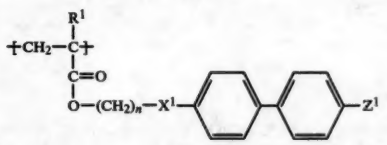
Thomas M. Leslie, Clinton Township, Hunterdon County; Hyun N. Yoon, New Providence; Ronald N. DeMartino, Wayne, and James B. Stamatoff, Westfield, all of N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Division of Ser. No. 915,180, Oct. 3, 1986. This application Oct. 15, 1987, Ser. No. 108,686

Int. Cl.[4] C08F *20/38, 20/34, 20/24*

U.S. Cl. 526—243 3 Claims

1. A transparent nonlinear optical medium produced in accordance with a process which comprises heating a thermotropic liquid crystalline polymer above the mesophase temperature range to form an isotropic melt phase, and cooling the isotropic melt phase rapidly to below the glass transition temperature of the polymer to form a transparent solid medium; wherein the transparent nonlinear optical medium exhibits a third order nonlinear optical susceptibility $\chi^{(3)}$ of at least about 1×10^{-11} esu as measured at 1.91 μm excitation wavelength, and wherein the polymer is characterized by a recurring monomeric unit corresponding to the formula:



where n is an integer between about 4–20; X^1 is $—NR^1—$, —O—, or —S—; R^1 is hydrogen or methyl; Z^1 is $—NO_2$, —CN or $—CF_3$; and where the polymer has a weight average molecular weight in the range between about 5000–200,000, and a glass transition temperature above about 40° C.; and wherein the optical medium exhibits less than about 5 percent scattering of transmitted incident light.

4,882,403

NON-HYDROUS SOFT CONTACT LENS AND PROCESS FOR PRODUCING THE SAME

Tetsuo Itoh, Machida; Noboru Satoh; Kazuhiko Takahashi, both of Yokohama; Taro Suminoe, Tokyo, and Takao Shimizu, Toda, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd. and Ricky Contact Lens, Inc., Tokyo, Japan

Filed May 27, 1988, Ser. No. 199,957

Claims priority, application Japan, May 29, 1987, 62-134115

The portion of the term of this patent subsequent to Apr. 12, 2005, has been disclaimed.

Int. Cl.[4] C08F *18/20*

U.S. Cl. 526—245 **16 Claims**

1. A non-hydrous soft contact lens comprising a copolymer comprising, as monomer units,:

(a) from 33.9 to 89 mol % of an acrylate represented by the general formula (I) shown below;

(b) from 4.9 to 65 mol % of a methacrylate represented by the general formula (II) shown below;

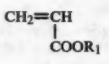
(c) from 1 to 20 mol % of at least one monomer selected from the group consisting of an unsaturated carboxylic acid, an unsaturated carboxylic acid anhydride an unsaturated carboxylic acid alkyl ester having a branched or cyclic alkyl group which may have a substituent, and an unsaturated carboxylic acid fluoroalkyl ester having a branched or cyclic fluoroalkyl group which may have a substituent;

(d) from 0 to 20 mol % of at least one monomer selected from the group consisting of an acrylic acid lower alkyl ester having a straight-chain alkyl group containing 1 to 3 carbon atoms, and an acrylic acid lower fluoroalkyl ester having a straight-chain fluoroalkyl group containing 1 to 3 carbon atoms;

(e) from 0 to 20 mol % of a methacrylic acid alkyl ester having a straight-chain alkyl group containing 4 to 10 carbon atoms; and

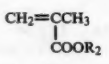
(f) from 0.1 to 10 mol % of a crosslinking monomer.

General formula (I):



wherein R_1 is at least one selected from the group consisting of a straight-chain fluoroalkyl group represented by the formula: $(CH_2)_l—C_mF_nH_p$, where l is an integer of 1 or 2, m is an integer of 3 to 8, n is an integer of 6 or more, p is an integer of 0 or more, and m , n and p have the relation of $n+p=2m+1$; and a straight-chain alkyl group represented by the formula: C_qH_{2q+1}, where q is an integer of 4 to 10.

General formula (II):



wherein R_2 is a straight-chain fluoroalkyl group represented by the formula: $(CH_2)_2—C_xF_yH_z$, where w is an integer of 1 or 2, x is an integer of 1 to 10, y is an integer of 3 or more, z is an integer of 0 or more, and x, y and z have the relation of $y+z=2x+1.1$

4,882,404

COPOLYMER COMPOSITIONS DERIVED FROM UNSATURATED TRIAZINES

Jacques Jarrin; Magali Robine, both of Rueil Malmaison, and Jean-Pierre Durand, Chatou, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

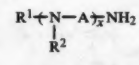
Filed Jun. 12, 1987, Ser. No. 60,785

Claims priority, application France, Jun. 13, 1986, 86 08697

Int. Cl.[4] C08F *226/06, 220/12*

U.S. Cl. 526—261 **19 Claims**

1. A copolymer composition, comprising (a) 55–99.8% b.w. of recurrent units derived from at least one acrylic or methacrylic ester and (b) 0.2–10% b.w. of recurrent units derived from at least one nitrogenous vinyl monomer obtained by reacting triallylcyanurate with at least one monoprimary or biprimary aliphatic amine, complying with the general formula:



wherein R^1 is a hydrogen atom or an alkyl radical $—C_nH_{2n+1}$, in which n is an integer from 1 to 24, x ranges from 1 to 10 or may be a 0 when n is at least 4, R^2 is a hydrogen atom or an alkyl radical $—C_mH_{2m+1}$, m being an integer from 1 to 24, and A is an alkylene group of 2–6 carbon atoms, said nitrogenous vinyl monomer containing 1 or 2 triazine rings and comprising at least one allyl group.

4,882,405

TERPOLYMERS OF ACRYLAMIDE, ALKYLACRYLAMIDE AND BETAINE MONOMERS

Donald N. Schulz, Annandale; Ilan Duvdevani, Leonia; Jan Bock, Bridgewater, and Enock Berluche, Lopatcong Township, Warren County, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

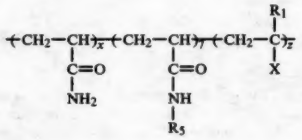
Continuation of Ser. No. 123,394, Nov. 26, 1987, abandoned, which is a continuation-in-part of Ser. No. 937,688, Dec. 4, 1986, Pat. No. 4,742,135, which is a continuation of Ser. No. 814,252, Dec. 30, 1985, Pat. No. 4,650,848. This application Oct. 19, 1988, Ser. No. 259,935

The portion of the term of this patent subsequent to Mar. 17, 2004, has been disclaimed.

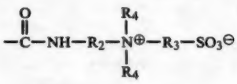
Int. Cl.[4] C08F *26/06*

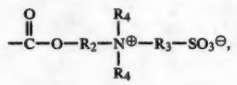
U.S. Cl. 526—265 **2 Claims**

1. A brine and water soluble terpolymer having the structure:

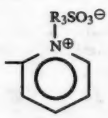


wherein X is selected from the group consisting of





and



wherein x is about 70 to about 95 mole percent; y is about 0.1 to about 5 mole percent, R_1 is methyl or hydrogen; z is about 1.0 to about 29.0 mole percent; R_2 is an alkyl group of 1–5 carbon atoms; R_3 is an alkyl group of 3 to 4 carbon atoms; R_4

is an alkyl group of 1–5 carbon atoms; and R_5 is an alkyl group of 4–20 carbon atoms.

4,882,406

NODULAR COPOLYMERS FORMED OF ALPHA-OLEFIN COPOLYMERS COUPLED BY NON-CONJUGATED DIENES

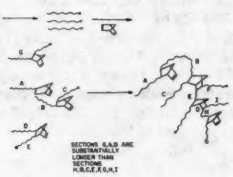
Charles Cozewith, Westfield; Shiaw Ju, Edison, and Gary W. Verstrate, Matawan, all of N.J., assignors to Exxon Research & Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 681,950, Dec. 14, 1984, abandoned, which is a continuation-in-part of Ser. No. 504,582, Jun. 15, 1983, Pat. No. 4,540,753. This application Mar. 5, 1986, Ser. No. 813,511

The portion of the term of this patent subsequent to Dec. 29, 2004, has been disclaimed.

Int. Cl.[4] C08F *12/34, 36/20, 212/34*

U.S. Cl. 526—336 51 Claims



1. A nodular ethylene -alpha-olefin copolymer product of copolymer chains having at least one of $\overline{M}_w/\overline{M}_n$ less than 2 and $\overline{M}_z/\overline{M}_w$ less than 1.8, comprising a nodule region of substantial cross-linking of copolymer chain second segments, with substantially uncross-linked copolymer chain first segments extending therefrom.

17. A process of forming a nodular ethylene - alpha-olefin copolymer product comprising a nodule region of substantial cross-linking of chain second segments, with substantially uncross-linked chain first segments extending therefrom, comprising reacting copolymer chains containing:

(a) a first segment in the form of one contiguous segment or a plurality of discontinuous segments comprising a copolymer of ethylene and an alpha-olefin; and

(b) a second segment comprising a copolymer of ethylene, an alpha-olefin and a coupling agent, said second segment constituting less than 50 percent by weight of said copolymer chain, said second segment being in the form of one contiguous segment or a plurality of discontinuous segments;

said coupling agent being cross-linkable under conditions which do not cross-link said first segment to any substantial extent, to form said nodular copolymer, said copolymer chains having at least one of $\overline{M}_w/\overline{M}_n$ less than 2 and $\overline{M}_z/\overline{M}_w$ less than 1.8.

34. A polymerization process for producing a copolymer chain comprising:

(a) a first segment comprising one contiguous segment or a plurality of discontinuous segments of a copolymer of ethylene and an alpha-olefin; and

(b) a second segment comprising a copolymer of ethylene, an alphaolefin and a coupling agent, said second segment constituting less than 50% by weight of said copolymer chain, said second segment being in the form of one contiguous segment or a plurality of discontinuous segments on a given chain;

said coupling agent being cross-linkable under conditions which do not cross-link said first segment to any substantial extent, said process comprising:

polymerizing a reaction mixture of ethylene and alpha-olefin until the weight of said ethylene-alpha-olefin copolymer has reached at least 50% of the anticipated polymer weight at completion of polymerization so as to form said first segment, and then incorporating said coupling agent to form said second segment;

wherein said reaction mixture comprises a plurality of said copolymer chains, and said process further comprises cross-linking the second segments of said plurality of said copolymer chains to form a nodule.

4,882,407

THERMOPLASTIC ENDODONTIC COMPOSITION HAVING IMPROVED MELT FLOW INDEX

John Riazi, Akron, Ohio, assignor to The Hygenic Corporation, Akron, Ohio

Division of Ser. No. 945,784, Dec. 23, 1986, Pat. No. 4,766,200, which is a continuation-in-part of Ser. No. 616,053, Jun. 1, 1984, Pat. No. 4,632,977. This application Apr. 18, 1988, Ser. No. 182,346

Int. Cl.[4] C08F *136/08*

U.S. Cl. 526—340.2 6 Claims

1. A novel endodontic thermoplastic polymer composition, consisting essentially of a thermoplastic polymer selected from the group consisting of synthetic and natural trans-polyisoprene having a melt flow index exceeding at least about 10 grams per 10 minutes at 105° C.

4,882,408

ONE-COMPONENT POLYURETHANE SYSTEMS CONTAINING VISCOSITY-REGULATING SUBSTANCES

Rainer Blum, Ludwigshafen, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jul. 11, 1988, Ser. No. 217,609

Claims priority, application Fed. Rep. of Germany, Jul. 24, 1987, 3724555

Int. Cl.[4] C08G *18/30*

U.S. Cl. 528—49 9 Claims

1. A mixture which contains, in a major amount, a one-component polyurethane system and, in an amount of 0.01 to 30 percent by weight based on the total weight of the one-component polyurethane system, a thixotropic and viscosity-regulating substance which is the reaction product prepared in the presence of the one-component polyurethane system of reactants

(A) monoamines and/or polyamines and/or polymeric substances having one or more amino groups and

(B) mono- and/or polyisocyanates and/or polymeric substances having one or more isocyanate groups,

wherein reactants (A) and (B) are reacted in a ratio such that there are one or more amino groups, per isocyanate group present, capable of reacting with the isocyanate groups and that all the isocyanate groups are reacted and 5–100% of the amino groups are reacted.

4,882,409

PROCESS FOR THE PRODUCTION OF HEAT-RESISTANT POLYURETHANE UREA ELASTOMERS

Gerhard Grögler; Andreas Ruckes, and Heinrich Hess, all of Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Filed Sep. 16, 1988, Ser. No. 245,880

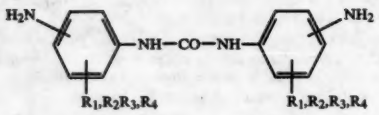
Claims priority, application Fed. Rep. of Germany, Sep. 29, 1987, 3732728

Int. Cl.[4] C08G *18/10*

U.S. Cl. 528—64 18 Claims

1. A process for the production of a polyurethane urea elastomer from a heterogeneous mixture comprising

(a) a diaminodiphenylurea corresponding to the formula



wherein R_1, R_2, R_3 and R_4, which may be the same or different, represent hydrogen or a C_1–C_6 alkyl radical and wherein the amino groups are in the meta and/or para position to the urea group and

(b) an NCO-terminated prepolymer based on a polyisocyanate and a polyhydroxyl compound having a molecular weight of 400 to about 10,000,

which comprises reacting the heterogeneous system to form a polyurethane urea elastomer by heating the mixture to a temperature of about 100 to 180 C.

4,882,410

MOLDING COMPOUNDS COMPRISING A THERMOPLASTICALLY PROCESSIBLE AROMATIC POLYESTER IMIDE

Wolfgang Neugebauer, Marl, and Heinz-Guenter Poll, Hilden, both of Fed. Rep. of Germany, assignors to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Sep. 21, 1988, Ser. No. 247,267

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1988, 3802511

Int. Cl.[4] C08G 73/16

U.S. Cl. 528—170 **14 Claims**

1. A molding compound, comprising:

a thermoplastically processible, aromatic polyester imide consisting essentially of monomer units corresponding to the following starting monomers:

(A) 10–70 mole % HO—Ar—COOH

(B) 0–44 mole % HOOC—Ar'—COOH

(C) 15–45 mole % HO—"Ar"—OH, and

(D) 1–45 mole % of a compound having the structure

wherein Ar, Ar' and Ar" are the same or different; and are 1,3- or 1,4-phenylene; 1,4-; 1,5-; 2,6- or 2,7-naphthylene or Y is —O—or —S—; X is —O—, —S—, $—SO_2—$, $—CR_2-$ or —CO—; R is H, C_1–C_4-alkyl; and n is 0 or 1; and wherein all quantities relate to the sum of A–D, and said sum equals 100 mole %, whereby the molar ratio of (B + D) : C ranges from 0.9:1 to 1.1:1.

4,882,411

PROCESS FOR THE PRODUCTION OF COLD-SETTING POLYURETHANE UREA ELASTOMERS

Gerhard Grögler; Andreas Ruckes; Heinrich Hess, all of Leverkusen, and Richard Kopp, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Filed Sep. 16, 1988, Ser. No. 245,877

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1987, 3732727

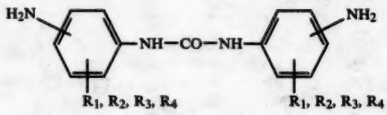
Int. Cl.[4] C08G 18/10

U.S. Cl. 528—54 **8 Claims**

1. A process for the preparation of a polyurethane urea elastomer from a mixture comprising

(a) an NCO-terminated prepolymer based on a polyisocyanate and a polyether polyol having a molecular weight of 400 to about 10,000 and an ethylene oxide content of about 10 to 60 mole-% and

(b) a solid diaminodiphenylurea corresponding to the formula



wherein R_1, R_2, R_3 and R_4 may be the same or different and represent hydrogen or a C_1–C_6 alkyl radical and wherein the amino groups are in the m- and/or p-position to the urea group,

which comprises reacting said NCO-terminated prepolymer with said diaminodiphenyl urea in a heterogeneous phase at a temperature of about 5° to 40° C.

4,882,412

POLYESTER POLYMER CONTAINING THE RESIDUE OF THE UV ABSORBING BENZOPYRAN COMPOUND AND SHAPED ARTICLES PRODUCED THEREFROM

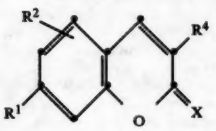
Max A. Weaver; Clarence A. Coates, Jr.; Wayne P. Pruett, all of Kingsport, and Samuel D. Hilbert, Jonesborough, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 126,315, Nov. 30, 1987, abandoned. This application Dec. 21, 1988, Ser. No. 287,815

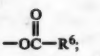
Int. Cl.[4] C08G 5/15

U.S. Cl. 528—190 **12 Claims**

1. A composition comprising molding grade polyester having copolymerized therein or reacted therewith the residue of a benzopyran compound having the formula

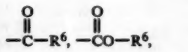


R^1 is hydroxy, —O—R^5 or

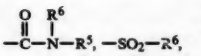


R^2 is hydrogen, alkyl, —O—R^5, or halogen;

R^4 is cyano,



carbamoyl,



or a carbocyclic or heterocyclic aryl radical; and

X is oxo or imino;

wherein

R^5 is alkenyl or an alkyl, cycloalkyl or aryl radical; and

R^6 is hydrogen or an alkyl, cycloalkyl or aryl radical; provided the benzopyran compound bears at least one substituent that is reactive with one of the monomers from which the polyester is derived, said residues absorbing radiation in the range of about 330 to 380 nm and being non-extractable from said polyester and stable under the polyester processing conditions.

4,882,413

NOVEL POLYMERS

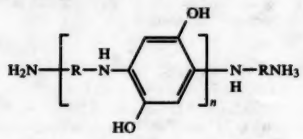
Semih Erhan, 2301 Cherry St., Apt. 12B, Philadelphia, Pa. 19103

Continuation-in-part of Ser. No. 890,904, Jul. 28, 1986, Pat. No. 4,831,107. This application May 24, 1988, Ser. No. 198,045

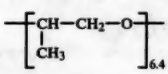
Int. Cl.[4] C08G *12/00*

U.S. Cl. 528—229 **3 Claims**

1. A polymer of the formula



wherein R is



and n is 70 to 700.

4,882,414

POLYAMIDE FROM POLYMERIC FATTY ACID AND LONG CHAIN DICARBOXYLIC ACID

Ronald J. Wroczynski, Pittsfield, Mass., assignor to Union Camp Corporation, Wayne, N.J.

Filed Nov. 29, 1984, Ser. No. 759,961

Int. Cl.[4] C08G *69/34*

U.S. Cl. 528—339.3 **3 Claims**

1. A polyamide which comprises the polyamide product of the polymerization reaction of a mixture of polyacids which comprises

(a) from 40 to 95 equivalent percent of a polymeric fatty acid; and

(b) from 5 to 60 equivalent percent of a diacid selected from the group consisting of 1,18-octadecanedicarboxylic acid and 1,16-hexadecane-dicarboxylic acid; with a substantially equivalent proportion of a polyamine wherein the polyamine comprises a mixture of from 40 to 80 equivalent percent piperazine and from 20 to 60 equivalent percent ethylenediamine.

4,882,415

POLYARYLENE DISULFIDE

Max Hunziker, Düdingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

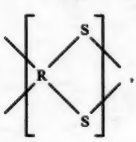
Filed Jun. 9, 1988, Ser. No. 205,261

Claims priority, application Switzerland, Jun. 17, 1987, 2276/87

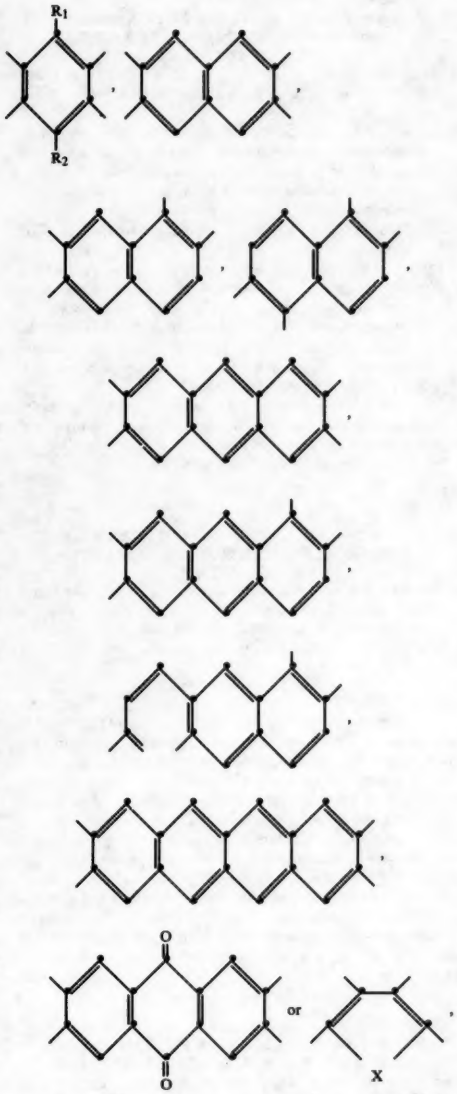
Int. Cl.[4] C08G *75/14*; H01B *1/02, 1/06*

U.S. Cl. 528—374 **7 Claims**

1. A chlorine-free polyarylene sulfide which is insoluble in organic solvents and infusible, essentially consisting of structural elements of the formula I



these elements being present in the molecule more than five times and in which R is one of the following radicals



(I) in which R_1 and R_2 independently of one another are each —H, C_1–C_{20}-alkyl, aryl having not more than 12 C atoms, aralkyl having not more than 20 C atoms, alkaryl having not more than 20 C atoms, —CN, —$OCOR_3$, —OH or —SR_4, in which R_3 and R_4 independently of one another are each a C_1–C_{20}alkyl or aryl having not more than 12 C atoms, X is NH, NR_5, S or O, in which R_5 is a C_1–C_{20}alkyl or an aryl having not more than 12 C atoms.

4,882,416

PREPARATION OF POLY ARYLENE SULFIDE WITH SPECIFIED RATIO OF SULFUR SOURCE TO CYCLIC ORGANIC AMIDE

Guy Senatore, Borger, Tex.; Wei-Teh W. Shang, and Kenneth D. Goetz, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Continuation of Ser. No. 17,948, Feb. 24, 1987, abandoned. This application Jun. 20, 1988, Ser. No. 209,253

Int. Cl.[4] C08G 75/16

U.S. Cl. 528—388 17 Claims

1. A process for preparing arylene sulfide polymers comprising the steps of:

(a) admixing compounds comprising at least one sulfur source and at least one cyclic organic amide in the presence of water to form an aqueous admixture wherein the molar ratio of said sulfur source to said cyclic organic amide is above 0.55:1;

(b) dehydrating said aqueous admixture to form a dehydrated admixture;

(c) admixing with said dehydrated admixture at least one polymerizable halo-substituted aromatic compound selected from the group consisting of dihalo-substituted aromatic compounds and mixtures of dihalo-substituted aromatic compounds with polyhalo-substituted aromatic compounds having 3–6 halogen atoms per molecule to form a polymerization mixture;

(d) subjecting said polymerization mixture to polymerization conditions effective to produce a mixture comprising an arylene sulfide polymer; and

(e) recovering said arylene sulfide polymer.

4,882,417

PREPARATION OF OLEFIN/CO COPOLYMER WITH CONTROLLED ADDITION OF CATALYST COMPOSITION

Maarten M. Geuze, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Feb. 9, 1989, Ser. No. 308,286

Claims priority, application Netherlands, Feb. 10, 1988, 8800324

Int. Cl.[4] C08G 67/02

U.S. Cl. 528—392 4 Claims

1. In the process of producing a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon by contacting under polymerization conditions a reaction mixture of the carbon monoxide and hydrocarbon in the prsence of a catalyst composition formed from a palladium compound, the anion of a non-hydrohalogenic acid having a pKa below about 6 and a bidentate ligand of phosphorus and a polymerization diluent, the improvement which comprises providing to the reaction mixture from about 25% to about 85% of the catalyst composition at the outset of polymerization and subsequently providing the remainder of the catalyst composition when the concentration of polymer product has reached a value of at least 0.2 g per 100 g of the suspension of the polymer in the diluent.

4,882,418

WASHING ARYLENE SULFIDE POLYMERS WITH WATER PLUS A REDUCING AGENT

Guy Senatore, Borger, Tex.; Afif M. Nesheiwat, and Fred T. Sherk, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 13, 1988, Ser. No. 284,169

Int. Cl.[4] C08G 75/16

U.S. Cl. 528—499 36 Claims

1. A process comprising the steps of:

(a) preparing a first slurry, wherein the solid component of said first slurry comprises a particulate arylene sulfide polymer recovered from a polymerization reaction mixture slurry, and wherein the liquid component of said first slurry comprises water and a reducing agent;

(b) heating said first slurry to a temperature of at least about 185° C. but below the melting point of said particulate arylene sulfide polymer, to wash and said particulate arylene sulfide polymer;

(c) cooling said first slurry to a temperature below about 100° C. to form a second slurry, wherein the solid component of said second slurry comprises a washed particulate arylene sulfide polymer; and

(d) recovering said washed, particulate arylene sulfide polymer from said second slurry.

4,882,419

PROCESS FOR PREPARING ANTIBIOTIC L 17392 (DEGLUCOTEICOPLANIN)

Adriano Malabarba, Milan; Paolo Strazzolini, Fiume Veneto, and Bruno Cavalleri, Milan, all of Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy

PCT No. PCT/EP85/00267, § 371 Date Feb. 6, 1986, § 102(e) Date Feb. 6, 1986, PCT Pub. No. WO86/00076, PCT Pub. Date Jan. 3, 1986

PCT Filed Jun. 4, 1985, Ser. No. 845,268

Claims priority, application United Kingdom, Jun. 13, 1984, 8415093

Int. Cl.[4] C07K 7/50, 1/00, 1/14

U.S. Cl. 530—317 11 Claims

1. A process for preparing antibiotic L 17392 which has the following characteristics

(a) it is soluble in water at a pH higher than 9 and aqueous methanol, ethanol and acetone; slightly soluble in ethyl alcohol and dimethylformamide

(b) an ultraviolet absorption maxima which shows the following absorption maxima:
in 0.1N hydrochloric acid: λ_{max} 279 nm ($E_{1\ cm}^{1}\%=87.1$)
in 0.1N sodium hydroxide: λ_{max} 297 nm ($E_{1\ cm}^{1}\%=165.3$)

(c) an infrared absorption spectrum in nujol with the following mainly significant absorption maxima (cm^{-1}):
3250 (ν NH; and phenolic ν OH)
1645 (Amide I)
1610 (ν COO^-)
1595 (δ NH_3^+)
1520 (Amide II)

(d) Some of the ^1H NMR data obtained after D_2O exchange and selective decoupling experiments of the ^1H NMR spectrum registered at 270 MHz with a Bruker WH-270 Spectrometer, in DMSO-d_6 at 50° C. (internal standard TMS, $\delta=0.00$ ppm) are as follows (δ, multiplicity): 2.85–3.30, 2dd; 4.12, dd; 4.37, d; 4.45, d; 4.50, s; 5.00, ddd; 5.11, d; 5.14, d; 5.35, d; 5.56, d; 5.60, d; 6.3–7.9, m; 6.55, d; 7.37, d; 7.50, d; 7.61, d; 8.26; d; 8.28, d; 8.5–10.2, br;
d=doublet
dd=doublets of doublets
ddd=doublet of doublets of doublets
s=singlet
m=multiplet
br=broad

(e) an elemental analysis which indicates the following approximate percentage composition (average): carbon 58.05%; hydrogen 3.58%; nitrogen 8.23%; chlorine 5.85%; (after correction for a weight loss of 11%, measured by thermal gravimetric analysis)

(f) a molecular weight of 1199 confirmed also by FAB-MS analysis

(g) the following formula [calculated on the basis of the available data]:

$C_{58}H_{45}Cl_2N_7O_{18}$

(h) a retention time (t_R) of 12.2 min when analyzed by HPLC using a pre-column (5 cm) packed with Perisorb RP-8 (30 μm; Merck) followed by a column Hibar RT 250-4 (Merck) prepacked with LiChrosorb RP-8 (10 μm)

and eluting with a liner step-gradient ranging from 10% to 30% acetonitrile in 0.2% aqueous ammonium formate; flow rate: 2 ml/min. (internal standard: Teicoplanin A_2 component 2, t_R=22.4 min)

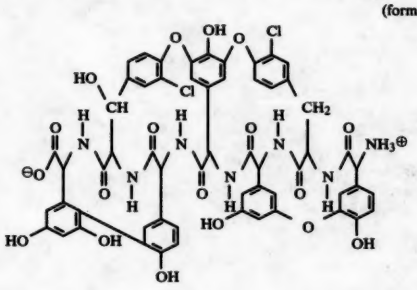
(i) an acidic function capable of forming salts

(l) a basic function capable of forming salts

(m) no sugar residue

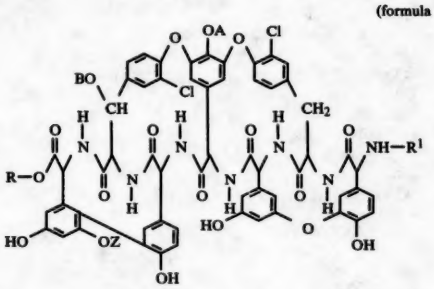
(n) the following putative chemical formula:

(formula I)



which comprises submitting a deglucoteicoplanin ester of formula II

(formula II)



wherein A, B and Z represent hydrogen atoms, R represents benzyl or substituted benzyl, wherein the phenyl group is substituted with at least a substituent selected from chloro, bromo, fluoro, nitro, (C_1–C_3)alkyl and (C_1–C_3)alkoxy, with the exclusion of the tri-nitro phenyl group, R′ is H, or acid addition salts thereof, to catalytic hydrogenolysis in the presence of a poisoned hydrogenation catalyst at a temperature from 10° C. to 40° C. and a pressure between ambient pressure and 5 atm, in an inert organic solvent in the presence of a mineral acid.

4,882,420

DIHALO-STATINE SUBSTITUTED RENIN INHIBITORS

Suvit Thaisrivongs, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

PCT No. PCT/US86/00713, § 371 Date Nov. 28, 1986, § 102(e) Date Nov. 28, 1986, PCT Pub. No. WO86/06379, PCT Pub. Date Nov. 6, 1986

Continuation-in-part of Ser. No. 828,407, Feb. 11, 1986, abandoned, which is a continuation-in-part of Ser. No. 725,190, Apr. 19, 1985, abandoned. This PCT application Apr. 7, 1986, Ser. No. 934,540

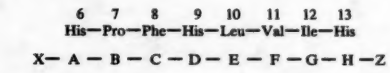
Int. Cl.[4] C07K *5/08, 5/10, 7/06*

U.S. Cl. 530—330 **8 Claims**

1. A renin inhibitory peptide of the formula II, shown in relation to the renin substrate as follows:

Renin Substrate

II



wherein X is

(a) hydrogen,

(b) R_{x1}—,

(c) R_{x1}—V_{x1}—$C(R_{x2})(R_{x3})CO$—,

(d) R_{x4}—$N(R_{x4})(CH_2)_{0\text{-}6}$—CO—,

(e) R_{x5}—O—CO—$(CH_2)_{1\text{-}6}$—CO—,

(f) R_{x5}—N—(R_{x5})—CO—$(CH_2)_{1\text{-}6}$—CO—,

(g) R_{x4}—SO_2—$N(R_{x5})(CH_2)_{1\text{-}6}$—CO—,

(h) R_{x4}—$N(R_{x4})(CH_2)_{0\text{-}6}$—$SO_2$—$(CH_2)_{1\text{-}6}$—CO—,

(i) Arg—,

(j) Arg—Arg—,

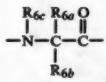
(k) R_{x6}—O—CH_2—CO—,

(l) R_{x6}—CH_2—O—CO—,

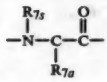
(m) R_{x6}—O—CO—, or

(n) R_{x6}—$(CH_2)_{0\text{-}6}$—CO—;

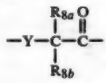
wherein —A— is absent or a divalent moiety of the formula IIA;



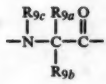
wherein —B— is absent or a divalent moiety of the formula IIB;



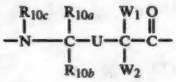
wherein —C— is absent or a divalent moiety of the formula IIC;



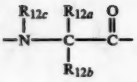
wherein —D— is a divalent moiety of the formula IID;



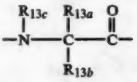
wherein —E—F— is a divalent moiety of the formula IIEF;



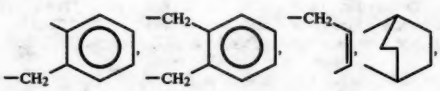
wherein —G— is absent or a divalent moiety of the formula IIG;



wherein —H— is absent or a divalent moiety of the formula IIH;

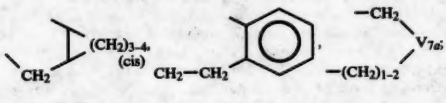


wherein Z is
(a) $—V_{z1}—(CH_2)_{0-6}—R_{z1}$,
(b) $—V_{z1}—CH_2—(C_1$-C_5hydroxyalkyl),
(c) $—V_{z1}—CH_2—(C_1$-C_5aminoalkyl),
(d) $—V_{z1}—CH_2—((C_1$-C_5alkyl)-(mono-, di-, or tri-C_1-C_5alkyl)amino,
(e) $—V_{z1}—CH_2—((C_1$-C_5alkyl)-guanidyl),
(f) d or l—Lys—OH,
(g) d or l—Lys—NH_2,
(h) d or l—Ser—OH, or
(i) d or l—Ser—NH_2;
wherein Y is $—N(R_{8c})—$, or divalent oxygen (—O—); with the provisos that
(1) when Y is absent or $—N(R_{8c})—$, X is
(a) hydrogen,
(b) $R_{x1}—$,
(c) $R_{x1}—V_{x1}—C(R_{x2})(R_{x3})CO—$,
(d) $R_{x4}—N(R_{x4})(CH_2)_{0-6}—CO—$,
(e) $R_{x5}—O—CO—(CH_2)_{1-6}—CO—$,
(f) $R_{x5}—N—(R_{x5})—CO—(CH_2)_{1-6}—CO—$,
(g) $R_{x4}—SO_2—N(R_{x5})(CH_2)_{1-6}—CO—$,
(h) $R_{x4}—N(R_{x4})(CH_2)_{0-6}—SO_2—(CH_2)_{1-6}—CO—$,
(i) Arg—, or
(j) Arg—Arg—; and
(2) when Y is —O—, A and B are both absent and X is
(a) hydrogen,
(b) $R_{x6}—O—CH_2—CO—$,
(c) $R_{x6}—CH_2—O—CO—$,
(d) $R_{x6}—O—CO—$,
(e) $R_{x6}—(CH_2)_{0-6}—CO—$, or
(f) $R_{x5}—N(R_{x5})—CH_2—CO—$;
wherein —U— is
(a) —C(O)—,
(b) —CH(OH)—, or
(c) $—CH(NH_2)—$;
wherein W_1 and W_2 are the same or different and are
(a) fluoro,
(b) chloro,
(c) bromo, or
(d) hydrogen with the proviso that W_1 and W_2 are not hydrogen simultaneously;
wherein R_{x1} is
(a) $R_{x4}—(CH_2)_{0-2}—$,
(b) $R_{x4}—CO—$,
(c) $R_{x4}—(CH_2)_{0-5}—O—CO$, wherein R_{x4} is not hydrogen,
(d) $R_{x4}—(CH_2)_{1-5}—CO—$,
(e) $R_{x4}—(CH_2)_{0-4}—SO_2—$,
(f) $R_{x4}—SO_2—(CH_2)_{0-4}—$, with the proviso that X_{x1} is other than oxygen for $(CH_2)_0$, or
(g) $R_{x4}—SO_2—(CH_2)_{2-4}—O—CO—$;
wherein R_{x2} is
(a) hydrogen,
(b) C_1-C_8alkyl,
(c) C_3-C_7cycloalkyl,
(d) aryl,
(e) heterocycle,
(f) $—CH(R_{x3})—$aryl,
(g) $—CH(R_{x3})—$heterocycle;
(h) $—CH_2CH_2—$aryl,
(i) $—CH_2CH_2—$heterocycle,
(j) —OH,
(k) $—CH(R_{x3})—OH$,
(l) $—CH(R_{x3})—SH$,
(m) $—CH(R_{x3})—OCH_3$, or
(n) $—CH(R_{x3})—SCH_3$;
wherein R_{x3} is
(a) hydrogen or
(b) C_1-C_3alkyl;
wherein R_{x4} is
(a) hydrogen,
(b) C_1-C_7alkyl,
(c) C_3-C_7cycloalkyl,
(d) $—CH_2—(C_1$-C_4hydroxyalkyl),
(e) $—CH_2—(C_1$-C_4aminoalkyl),
(f) aryl or
(g) heterocycle;
wherein R_{x5} is
(a) hydrogen or
(b) C_1-C_6alkyl;
wherein R_{x6} is
(a) C_1-C_6alkyl,
(b) C_3-C_7alkyl,
(c) aryl, or
(d) heterocycle;
wherein R_{6a} is
(a) hydrogen, or
(b) C_1-C_3alkyl;
wherein R_{6b} is $—[CH(R_{6e})]_{0-3}—R_{6f}$;
wherein R_{6c} is
(a) hydrogen, or
(b) C_1-C_3alkyl;
wherein R_{6e} is
(a) hydrogen, or
(b) C_1-C_3alkyl;
wherein R_{6f} is
(a) hydroxy,
(b) C_1-C_6alkyl,
(c) C_3-C_{10}cycloalkyl,
(d) aryl,
(e) heterocycle,
(f) $—(CH_2)_{0-3}—SH$,
(g) C_7-C_{14}bi- or tricycloalkyl,
(h) C_1-C_4hydroxyalkyl,
(i) C_1-C_3alkyloxy,
(j) C_1-C_3alkyloxy—$(C_1$-C_4alkyl)—,
(k) aryl—O—,
(l) aryl—O—$(C_1$-C_4alkyl)-,
(m) aryl—CH_2—O—, or
(n) aryl—CH_2—O—$(C_1$-C_4alkyl)—;
wherein R_{7a} is
(a) hydrogen, or
(b) C_1-C_3alkyl;
wherein R_{7s} is
(a) $—(CH_2)_3—$, or
(b) a divalent substituent of the formula 7A, 7B, 7C, 7D, 7E, 7F, or 7G;



7A 7B 7C 7D

-continued



7E 7D

wherein R_{8a} is
(a) hydrogen, or
(b) C_1–C_3alkyl;
wherein R_{8b} is —$[CH(R_{6e})]_{0-3}$—R_{6f};
wherein R_{8c} is
(a) hydrogen, or
(b) C_1–C_3alkyl;
wherein R_{9a} is
(a) hydrogen, or
(b) C_1–C_3alkyl;
wherein R_{9b} is —$[CH(R_{9e})]_{0-3}$—R_{9f};
wherein R_{9c} is
(a) hydrogen, or
(b) C_1–C_3alkyl;
wherein R_{9e} is
(a) hydrogen, or
(b) C_1–C_3alkyl;
wherein R_{9f} is
(a) hydrogen,
(b) aryl,
(c) heterocycle,
(d) C_1–C_6alkyl,
(e) C_3–C_{10}cycloalkyl,
(f) C_7–C_{14}bi- or tricycloalkyl,
(g) —NH_2,
(h) —OH,
(i) C_1–C_4aminoalkyl,
(j) C_1–C_4hydroxyalkyl,
(k) C_1–C_3alkyloxy—(C_1–C_4alkyl)—
(l) —$(CH_2)_{1-6}$—NHC(=NH)NH_2,
(m) —CH_2SCH_3,
(n) —$(CH_2)_{0-4}CO$—R_{9d},
(o) —O—aryl,
(p) —O—CH_2—aryl,
(q) —(C_1–C_4alkyl)—O—aryl,
(r) —(C_1–C_4alkyl)—O—CH_2—aryl,
(s) —O—CH_2—heterocycle, or
(t) —(C_1–C_4alkyl)—O—CH_2—heterocycle;
wherein R_{9d} is
(a) hydrogen,
(b) NH_2, or
(c) C_1–C_3alkyloxy;
wherein R_{10a} is
(a) hydrogen, or
(b) C_1–C_3alkyl;
wherein R_{10b} is
(a) C_1–C_7alkyl,
(b) C_3–C_7cycloalkyl,
(c) —$(CH_2)_{1-4}$—(C_3–C_7cycloalkyl),
(d) —$(CH_2)_{1-4}$—aryl,
(e) —$(CH_2)_{1-4}$—heterocycle,
(f) C_5–C_7cycloalkenyl, or
(g) —$(CH_2)_{1-4}$—(C_5–C_7cycloalkenyl);
wherein R_{10c} is
(a) hydrogen, or
(b) C_1–C_3alkyl;
wherein R_{12a} is
(a) hydrogen, or
(b) C_1–C_3alkyl;
wherein R_{12b} is
(a) hydrogen, or
(b) —$[CH(R_{12e})]_{0-4}$—R_{12f};
wherein R_{12c} is
(a) hydrogen, or
(b) C_1–C_3alkyl;
wherein R_{12e} is
(a) hydrogen, or
(b) C_1–C_3alkyl;
wherein R_{12f} is
(a) hydrogen,
(b) aryl,
(c) heterocycle,
(d) C_1–C_6alkyl,
(e) C_3–C_{10}cycloalkyl, or
(f) C_7–C_{14}bi- or tricycloalkyl;
(g) hydroxy,
(h) C_1–C_4hydroxyalkyl,
(i) C_1–C_3alkyloxy,
(j) C_1–C_3alkyloxy—(C_1–C_4alkyl)—,
(k) aryl—O—,
(l) aryl—O—(C_1–C_4alkyl)—,
(m) aryl—CH_2—O—, or
(n) aryl—CH_2—O—(C_1–C_4alkyl)—;
wherein R_{13a} is
(a) hydrogen, or
(b) C_1–C_3alkyl;
wherein R_{13b} is —$[CH(R_{13e})]_{0-4}$—R_{13f};
wherein R_{13c} is
(a) hydrogen, or
(b) C_1–C_3alkyl;
wherein R_{13e} is
(a) hydrogen, or
(b) C_1–C_3alkyl;
wherein R_{13f} is
(a) hydrogen,
(b) aryl,
(c) heterocycle,
(d) C_1–C_6alkyl
(e) C_3–C_{10}cycloalkyl,
(f) C_7–C_{14}bi- or tricycloalkyl,
(g) hydroxy,
(h) amino,
(i) C_1–C_4aminoalkyl,
(j) C_1–C_4hydroxyalkyl,
(k) C_1–C_3alkyloxy,
(l) C_1–C_3alkyloxy—(C_1–C_4alkyl)—,
(m) —$(CH_2)_{1-6}$—NHGC(=NH)NH_2,
(n) —CH_2SCH_3,
(o) —$(CH_2)_{0-4}$—CO—R_{13g},
(p) aryl—O—,
(q) aryl—O—(C_1–C_4alkyl)—
(r) aryl—CH_2—O—,
(s) aryl—CH_2—O—(C_1–C_4alkyl)—
(t) heterocycle—CH_2—O—, or
(u) heterocycle—CH_2—O—(C_1–C_4alkyl)—;
wherein R_{13g} is
(a) OH,
(b) NH_2, or
(c) C_1–C_3alkyloxy;
wherein R_{z1} is
(a) hydrogen,
(b) C_1–C_7 alkyl,
(c) C_3–C_7cycloalkyl,
(d) aryl, or
(e) heterocycle; and
wherein R_{z2} is
(a) hydrogen, or
(b) C_1–C_3alkyl;
wherein V_{x1} is
(a) —CH_2—,
(b) —$CH(R_{x1})$,
(c) —$N(R_{x5})$—,
(d) —O—;
(e) —S—,
(f) —SO—, or
(g) —SO_2—;
wherein V_{z1} is
(a) —O—,
(b) —S—, or

(c) —N(R_{22})—;
wherein V_{7a} is
(a) —O—,
(b) —S—, or
(c) —CH(OH)—.

4,882,421

PHARMACEUTICAL FOR TREATING TUMORS AND METHOD FOR MAKING IT

Kuslima Shogen, Somerset; Stanislaw M. Mikulski, Essex Fells, and Wojciech J. Ardelt, Passaic, all of N.J., assignors to Alfacell Corporation, Bloomfield, N.J.

Continuation-in-part of Ser. No. 776,798, Sep. 17, 1985, which is a continuation-in-part of Ser. No. 643,808, Aug. 23, 1984, abandoned, which is a continuation of Ser. No. 422,034, Sep. 23, 1982, abandoned. This application Apr. 6, 1988, Ser. No. 178,118

Int. Cl.[4] C07K *3/02, 3/12*

U.S. Cl. 530—350 21 Claims

1. A substantially pure protein having a molecular weight of approximately 14,000 to 16,000 Daltons and an amino acid composition approximately as follows:

AMINO ACID	APPROX. # OF RESIDUES PER MOLECULE OF MATERIAL
Aspartic acid/Asparagine	20
Threonine	13
Serine	11
Glutamic acid/Glutamine	9
Proline	6
Glycine	4
Alanine	4
Cystine/2	10
Valine	11
Methionine	1
Isoleucine	8
Leucine	7
Tyrosine	3
Phenylalanine	8
Histidine	4
Lysine	17
Arginine	4
Tryprophan	2
Approximate Total	142

4,882,422

PULMONARY SURFACTANT PROTEINS

H. William Taeusch, Redondo Beach, Calif.; Kenneth A. Jacobs, Newton, Mass.; D. Randall Steinbrink, Melrose, Mass.; Joanna Floros; David S. Phelps, both of West Roxbury, Mass., and Edward F. Fritsch, Concord, Mass., assignors to Genetics Institute, Inc., Cambridge, Mass.

Continuation-in-part of Ser. No. 791,120, Sep. 26, 1985, abandoned, and a continuation-in-part of Ser. No. 897,183, Sep. 26, 1985, abandoned. This application Sep. 24, 1987, Ser. No. 100,372

Int. Cl.[4] C07K *13/00;* A61K *37/02*

U.S. Cl. 530—350 1 Claim

1. A purified human protein useful for enhancing pulmonary surfactant activity characterized by a molecular weight of about 35,000 daltons and a polypeptide sequence encoded by a DNA sequence selected from the group consisting of the cDNA insert in vector PSP35K-1A-10 (ATCC No. 40243) and the cDNA insert in vector PSP35K-68-A (ATCC No. 40244).

4,882,423

SUBSTANCE-CONJUGATED COMPLEMENT COMPONENT C1Q

Fumiaki Taguchi, 14-1, Yokodai 5-chome, Sagamihara-shi, Kanagawa-ken; Isamu Mitsui, Yokohama; Kinichi Hara, Yokohama; Masaro Hayashi, Yokohama; Kunio Ezawa, Tokyo; Kenichi Fukunaga, Tokyo, and Jun Kuranari, Tokyo, all of Japan, assignors to Calpis Food Industry and Fumiaki Taguchi, both of, Japan

Continuation-in-part of Ser. No. 779,671, Sep. 24, 1985, abandoned. This application Mar. 30, 1987, Ser. No. 32,025

Claims priority, application Japan, Oct. 2, 1984, 59-205686; Oct. 25, 1984, 59-223049; May 17, 1985, 60-103898; Jul. 24, 1985, 60-162012; Jul. 29, 1985, 60-166004; Mar. 31, 1986, 61-70936; Mar. 31, 1986, 61-70937; Mar. 31, 1986, 61-70938

Int. Cl.[4] C07K *15/00*

U.S. Cl. 530—380 31 Claims

1. A complement component C1q wherein a substance is conjugated via a sulfur atom to at least one site of said component, said site not being involved in binding immunoglobulins,

said substance being selected from the group consisting of signal emitting substances and cell function regulating substances, said signal emitting substance being a member selected from the group consisting of enzymes, coenzymes, enzyme substrates, dyestuffs and pigments, magnetizable substances, donors and acceptors for electron transference, radioactive substances, metal compounds, metal compositions and agglutinating substances,

said cell function regulating substance being selected from the group consisting of antibiotics, growth factors, hormones, cell activation factors, cell division factors, anticancer agents and toxins.

4,882,424

ACTIVATION ANTIGEN

Stuart Schlossman, Newton Center; Chikao Morimoto, Needham, and Christopher Rudd, Somerville, all of Mass., assignors to Dana-Farber Cancer Institute, Inc., Boston, Mass.

Filed May 11, 1987, Ser. No. 49,348

Int. Cl.[4] A61K *39/395, 39/00;* C12P *21/00*

U.S. Cl. 530—387 5 Claims

1. An antibody which specifically binds to a protein antigen present in the T-cells of *Aotus trivirgatus,* said antigen comprising two major polypeptides having molecular weights determined by SDS-PAGE analysis of 140 KD and 105 KD respectively under reducing conditions and 120 KD and 90 KD respectively under non-reducing conditions and having isoelectric points of pH 3–5 by non-equilibrium pH gradient gel electrophoresis/polyacrylamide gel electrophoresis analysis,

said antibody producing, in combination with phorbol myristate acetate or with anti-$T11_3$, proliferation of T-cells bound to said antibody.

4,882,425

RECEPTOR SPECIFIC PROTEINS AND THEIR USE IN RECEPTOR TYPING

Richard A. Hull; Sheila I. Hull, and Bogdan Nowicki, all of Houston, Tex., assignors to Baylor College of Medicine, Houston, Tex.

Filed Jul. 9, 1987, Ser. No. 72,197
Int. Cl.[4] C07K *15/04, 15/14*
U.S. Cl. 530—396 4 Claims

1. As a composition of matter, a receptor specific protein selected from the group consisting of En, Dr, DrCM^R and Pglobo, said receptor specific protein,
being isolated from bacteria,
having a polymerized fimbriae structure,
having the following antigenic specificity to erythrocyte antigens;

Receptor Specific Protein	Erythrocyte Antigen
En	En(a$^+$), En(a$^-$)
Dr	Dr+, Dr−
DrCM^R	DrCM^R
Pglobo	Pglobo

having the following amino acid composition:

Amino Acid	En	Pglobo	Dr	DrCM^R
	% of total			
Ile	5.1	3.9	3.5	3.4
Gly	8.9	13.8	15.6	16.2
Leu	5.1	5.9	6.9	6.8
Val	10.8	11.2	6.1	6.0
Tyr	1.9	1.3	0.0	0.0
Thr	10.8	8.6	13.	12.8
Asn	6.4	6.6	*	*
Asp	5.1	7.2	12.1	12.8
Phe	4.5	5.3	1.7	1.7
Pro	1.9	3.3	1.7	1.7
Lys	3.8	7.9	3.5	3.4
Gln	6.4	4.6	*	*
Glu	1.9	3.9	8.6	8.5
Ala	13.4	11.8	5.2	5.1
Ser	8.3	1.3	1.5	9.4
Met	0.6	0.6	2.6	2.6
His	2.5	1.3	2.6	2.6
Lys	1.3	1.3	2.2	2.1
Arg	1.3	0.0	5.2	5.1
Trp	0.0	0.0	0.0	0.0

having the following molecular weight on SDS-PAGE electrophoresis: En=17,500, Dr=15,000, Dr−CM^R=16,000, and Pglobo=19,500; and having the following N-terminal amino acid sequences:

En	Ala Thr Thr Val Asn Gly Gly Thr Val His Phe Lys Gly Glu Val Val Asn Ala Ala Cys Ala Val Asn Met
DrCM^R	Asn Phe Thr Ser Ser Gly Thr Asn Gly Lys Val Asp Leu Thr Ile Thr Glu Glu Lys Arg Val Thr Val Glu
Pglobo	Ala Pro Thr Ile Pro Gln Gly Gln Gly Lys Val Thr Phe Asn Gly Thr Val Val Asp Ala Pro Cys Ser Ile
Dr	Thr Phe Gln Ser Gly Thr Thr Gly Ile Thr Thr Leu Thr Val

4,882,426

BEADS OF CROSS-LINKED GLUCOMANNAN AND PRODUCTION THEREOF

Yoshiaki Motozato, Kumamoto, Japan, assignor to Kurita Water Industries, Ltd., Tokyo, Japan

Filed Jul. 8, 1987, Ser. No. 70,950
Int. Cl.[4] A61K *29/02;* C09K *3/00*
U.S. Cl. 536—114 11 Claims

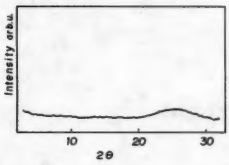
1. Glucomannan beads produced from glucomannan esters for use for gel filtration and gel chromatography, which are porous and have a cross-linked structure and exhibit a degree of swelling in the range from 2 to 8 ml of wet gel bed per g of dry gel, an exclusion limit molecular weight in the range from 1,000,000 to 100,000,000, and an average bead size in the range from 1 to 500 μm and a matrix volume proportion of at least 15% at an exclusion limit molecular weight of about 1,000,000, wherein matrix volume proportion is the proportion of true volume of glucomannan substrate to the apparent volume of the glucomannan bead.

4,882,427

TITANIUM PHTHALOCYANINE OPTICAL SEMICONDUCTOR MATERIAL AND ELECTROPHOTOGRAPHIC PLATE USING SAME

Toshio Enokida, and Shigemasa Takano, both of Tokyo, Japan, assignors to Toyo Ink Manufacturing Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 120,840, Nov. 16, 1987, abandoned.
This application Feb. 17, 1989, Ser. No. 312,425
Int. Cl.[4] C09B *47/04*
U.S. Cl. 540—141 15 Claims



1. An optical semiconductor material comprising:
(1) a noncrystalline material comprising a titanium phthalocyanine compound selected from the group consisting of a titanium phthalocyanine compound having no substituents on the benzo moieties of the molecule, and a low halogenated titanium phthalocyanine compound having not more than 0.51 halogen substituents in the titanium phthalocyanine molecule, which does not substantially show X-ray diffraction peak in X-ray diffraction chart, or
(2) a pseudo-noncrystalline material comprising a titanium phthalocyanine compound selected from the group consisting of a titanium phthalocyanine compound having no substituents on the benzo moieties of the molecule, and a low halogenated titanium phthalocyanine compound having not more than 0.51 halogen substituents in the titanium phthalocyanine molecule which shows broad X-ray diffraction peaks at 6.0°, 15.5°, 23.4° and 25.5° of Bragg angle (2θ≅0.2°), or
(3) a mixture of said noncrystalline and said pseudononcrystalline materials.

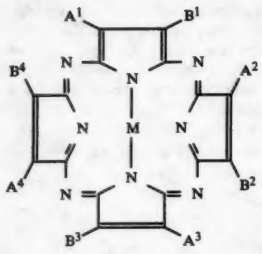
4,882,428

AZAPORPHYRIN COMPOUNDS

Masahiro Irie, Sakai, Japan, assignor to Mitsubishi Chemical Industries Limited, Tokyo, Japan

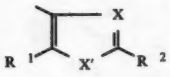
Filed Mar. 11, 1988, Ser. No. 167,231
Claims priority, application Japan, Oct. 8, 1987, 62-254120; Jan. 22, 1988, 63-11895
Int. Cl.[4] C07D *487/22*
U.S. Cl. 540—121 8 Claims

1. An azoporphyrin compound of the formula:



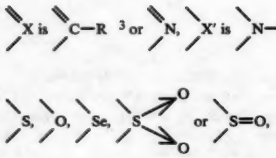
(I)

wherein M is 2H, or a metal atom of Group VIII, Ib, IIb, IIIb, IVa, Va, VIa or VIIa of the Periodic Table or its oxide or halide, and each of A^1, A^2, A^3, A^4, B^1, B^2, B^3 and B^4 is a group of the formula II or III:



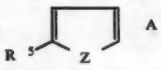
(II)

where

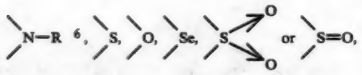


R^1 is an alkyl group, a halogen atom or a trifluoromethyl group, each of R^2 and R^3 is a hydrogen atom, an alkyl group, a halogen atom, a trifluoromethyl group or a substituted or unsubstituted phenyl group, and R^4 is a hydrogen atom or a substituted or unsubstituted alkyl, aryl or cycloalkyl group,

(III)



wherein ring A is a hydrocarbon ring or a hetero ring, Z is



and R^5 is an alkyl group, a halogen atom or a trifluoromethyl group, wherein R^6 is a hydrogen atom or a substituted or unsubstituted alkyl, aryl or cycloalkyl group, provided that A^1 and B^1, A^2 and B^2, A^3 and B^3, and A^4 and B^4 are, respectively, cyclizable by irradiation with light to form a cyclohexadiene ring and thereby change the optical properties.

4,882,429

STEREOSPECIFIC PREPARATION OF (3S,4R,5R)-3-(1-HYDROXYETHYL)-4-BENZOYLOXY-AZERIDINONES FROM L-(−)-THEONINE

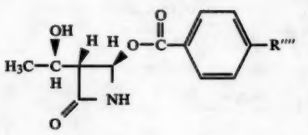
Stuart W. McCombie, Caldwell; Michael P. Kirkup, Somerset, both of N.J., and Amy Sommese Boland, Pittsburgh, Pa., assignors to Schering Corporation, Kenilworth, N.J.

Filed Mar. 3, 1986, Ser. No. 835,392

Int. Cl.[4] C07D *205/08*; C07B *41/12, 37/10*; A61K *301/24*

U.S. Cl. 540—357 **9 Claims**

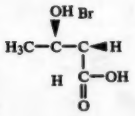
1. A process for preparing a compound represented by the formula



I

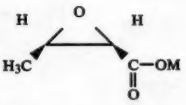
wherein R'''' is hydrogen, halogen or lower alkyl; comprising the steps

(a) reacting L-(−)-threonine with an alkali metal bromide and an alkali metal nitrite to produce a compound represented by the formula



2

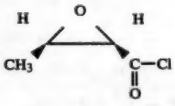
(b) reacting the compound produced in step (a) with an alkali metal base, to produce a compound represented by the formula



3

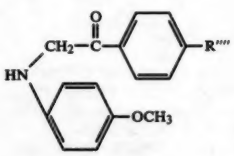
wherein M is an alkali metal

(c) reacting the compound produced in step (b) with oxalyl chloride to produce the compound represented by the formula



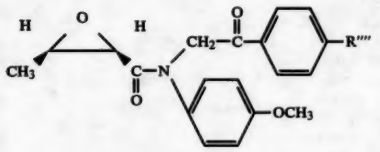
4

(d) reacting, without isolating, the compound produced in step (c) with a compound represented by the formula



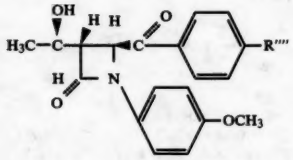
7

in the presence of an organic base to produce a compound represented by the formula



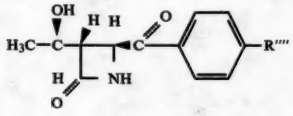
8

(e) reacting the compound produced in step (d) with a strong base to produce a compound represented by the formula



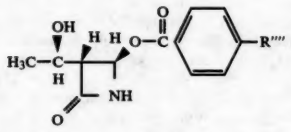
9

(f) reacting the compound produced in step (e) with aqueous ceric ammonium nitrate or ozone in a lower alkanol, lower alkyl ester of a lower alkanoic acid, or acetic acid to produce a compound represented by the formula



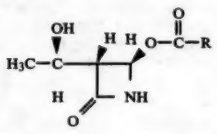
10

(g) reacting the compound produced in step (f) with a peracid to produce a compound represented by the formula



wherein R'''' is as defined hereinabove.

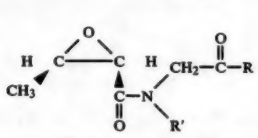
7. A process for preparing a compound represented by the formula



Ia

wherein R is phenyl or substituted phenyl wherein the substituents are lower alkyl or halogen; which comprises the steps

(a) reacting a compound represented by the formula



wherein R is as defined for formula Ia and R' is allyl or mono or dimethoxy phenyl with a strong base;

(b) reacting the product of step (a) with aqueous ceric ammonium nitrate or ozone in a lower alkanol, a lower alkyl ester of a lower alkanoic acid or acetic acid; and

(c) reacting the product of step (b) with a peracid to yield compound Ia.

4,882,430

RECOVERY OF CAPROLACTAM FROM CAPROLACTAM DISTILLATION LOW BOILERS OR HIGH BOILERS OR MIXTURES THEREOF

Gerald Neubauer, Weinheim, Fed. Rep. of Germany; Emile De Decker, Schoten, Belgium; Hugo Fuchs, Ludwigshaften, Fed. Rep. of Germany; Bernhard Holzknecht, Ellerstadt, Fed. Rep. of Germany, and Josef Ritz, Ludwigshafen, Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Oct. 13, 1988, Ser. No. 257,274

Int. Cl.[4] C07D *201/16*

U.S. Cl. 540—540 **8 Claims**

1. A process for recovering caprolactam from a caprolactam distillation low boiler or high boiler or a mixture thereof, comprising the following steps:

(a) crystallizing a low or high boiler or a mixture thereof to form purified capro-lactam crystals and a mother liquor,

(b) separating off the purified caprolactam crystals to leave a mother liquor,

(c) recycling from 5 to 90% by weight of the mother liquor of stage (b) into stage (a) and transferring the remainder of the mother liquor into the subsequent stage (d),

(d) crystallizing the mother liquor portion from stage (c) to form caprolactam crystals and a mother liquor,

(e) separating off the caprolactam crystals of stage (d) and recycling the same into stage (a) to leave a mother liquor,

(f) recycling from 20 to 99% by weight of the mother liquor of stage (e) into stage (d) and channeling out the remainder of the impurity-containing mother liquor of stage (e).

4,882,431

OXA(THIA)ZOLIDINE DERIVATIVES

Keiichi Ishimitsu, Odawara; Hiroyuki Imagawa, Yokohama; Tomio Yamada, Hiratsuka; Michihiko Matsuda, and Yukio Kitagawa, both of Odawara, all of Japan, assignors to Nippon Soda Co., Ltd., Tokyo, Japan

PCT No. PCT/JP87/00552, § 371 Date Mar. 18, 1988, § 102(e) Date Mar. 18, 1988, PCT Pub. No. WO88/00943, PCT Pub. Date Feb. 11, 1988

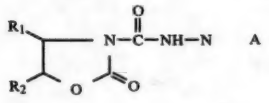
PCT Filed Jul. 28, 1987, Ser. No. 186,489

Claims priority, application Japan, Jul. 29, 1986, 61-176740

Int. Cl.[4] C07D *263/16*; A01N *43/76*

U.S. Cl. 540—603 **1 Claim**

1. A compound having the formula



A

wherein R_1 denotes C_{1-6} alkyl radicals; R_2 denotes the phenyl radical which may be substituted by halogen atoms, C_{1-6} alkyl radicals, C_{1-6} haloalkyl radicals, C_{1-6} alkoxy radicals, C_{1-6} haloalkoxy radicals or methylenedioxy radicals;

A

denotes a heterocyclic radical selected from the group consisting of piperidino, morpholino, 1-piperazinyl, 1-pyrrolidinyl

and 1-perhydroazepinyl which may be substituted by C_{1-6} alkyl radicals.

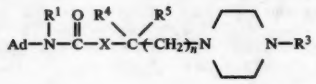
4,882,432

POLYCYCLIC-CARBAMIC ACID PIPERAZINOALKYL ESTERS AND AMIDES

Magid A. Abou-Gharbia; John P. Yardley, both of Gulph Mills, and Wayne E. Childers, Jr., Yardley, all of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Jan. 9, 1989, Ser. No. 294,853
Int. Cl.[4] C07D 403/04, 241/04
U.S. Cl. 544—295 8 Claims

1. A compound of the formula:



wherein
Ad is 1-adamantyl, 2-adamantyl or 3-noradamantyl;
X is —O— or

n is 1, 2, 3 or 4;
R^1 and R^2 are, independently, hydrogen, alkyl of 1 to 3 carbon atoms, phenyl, benzyl, or substituted phenyl or benzyl in which the substituent is alkyl of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms, halo, cyano, nitro or trifluoromethyl;
R^3 is phenyl, benzyl or substituted phenyl or benzyl in which the substituent is alkyl of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms, halo, nitro, cyano or perhalomethyl, 2-, 3-, or 4-pyridinyl, 2-, 4- or 5-pyrimidinyl or 2- or 3-pyrazinyl;
and
R^4 and R^5 are, independently, hydrogen, methyl, phenyl or benzyl; or a pharmaceutically acceptable salt thereof.

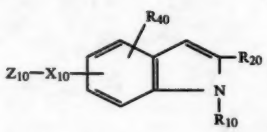
4,882,433

3'-PYRIDINYLALKYLINDEN- AND 3'-PYRIDINYLALKYLINDOL-2-CARBOXYLIC ACIDS AND ANALOGS

Roy A. Johnson, Kalamazoo, and Chiu-Hong Lin, Portage, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 85,103, Jun. 29, 1987, Pat. No. 4,767,865, which is a continuation of Ser. No. 792,903, Oct. 30, 1985, abandoned. This application Mar. 28, 1988, Ser. No. 174,265
Int. Cl.[4] C07D 401/06, 401/12
U.S. Cl. 546—273 7 Claims

1. A compound of the formula II



wherein Z_{10} is
(a) 4-pyridinyl, or
(b) 3-pyridinyl;
wherein X_{10} is:
(a) $—(CH_2)_n—$, or
(b) $—CH_2NH—$;
wherein R_{10} is:
(a) hydrogen,
(b) methyl, or
(c) benzyl;
wherein R_{20} is $COOR_3$;
wherein R_3 is:
(a) hydrogen,
(b) a pharmacologically acceptable cation, or
(c) $(C_1–C_4)$alkyl;
wherein R_{40} is:
(a) $(C_1–C_4)$alkyl,
(b) chloro,
(c) bromo,
(d) OCH_3, or
(e) hydrogen;
wherein R_{50} is:
(a) hydrogen, or
(b) $(C_1–C_4)$alkyl;
wherein n is an integer from 1 to 2; or a pharmacologically acceptable salt thereof.

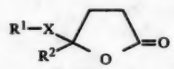
4,882,434

GAMMA-LACTONECARBOXYLIC ACID DERIVATIVES AND THEIR USE AS ANTIBACTERIAL AGENTS OR INTERMEDIATES

Kouichi Yoshioka, Kyoto, Japan, assignor to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Oct. 21, 1987, Ser. No. 111,514
Claims priority, application Japan, Oct. 29, 1986, 61-257629; Apr. 6, 1987, 62-84477
Int. Cl.[4] C07D 405/12, 409/12, 413/14, 417/12
U.S. Cl. 546—283 5 Claims

1. A compound of the formula



wherein R^1 is (1) C_{1-6}alkyl which is unsubstituted or is substituted by pyridyl, thienyl, furyl or phenyl, (2) C_{4-6}cycloalkyl, (3) phenyl which is unsubstituted or is substituted by halogen, nitro, cyano, C_{1-3} or C_{1-3} alkoxyl, (4) pyridyl which is unquaternized or quaternized and which is unsubstituted or is substituted by methyl, or (5) imidazolyl which is unsubstituted or is substituted by methyl; R^2 is a carboxyl group which is free or is esterified by C_{1-10}alkyl, benzyl, nitrobenzyl or benzhydryl; and X is an oxygen atom or a sulfur atom which is unoxidized or is oxidized, or a salt thereof.

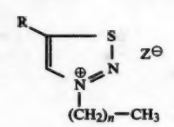
4,882,435

PHARMACEUTICAL PREPARATIONS

Heinrich H. Paradies, Iserlohn, Fed. Rep. of Germany, assignor to Medice Chem.-Pharm. Fabrik, Fed. Rep. of Germany

Division of Ser. No. 82,891, Aug. 6, 1987. This application Mar. 9, 1989, Ser. No. 321,436
Int. Cl.[4] C07D 285/06
U.S. Cl. 548—127 2 Claims

1. A compound having the formula



in which:
R is a member selected from the group consisting of H, CH_3, and OH;
Z is a member selected from the group consisting of chloride, bromide, iodide, maleate, formate, acetate, propio-

nate, HSO_4HU-, malate, fumarate, salicylate, alginate, gluconate, glucoronate, galactoronate, ethylsulfate and $H_2PO_4^-$; and

n is 8 to 20.

4,882,436

SEMI-POLAR HYPERDISPERSANTS FOR PIGMENT BASES

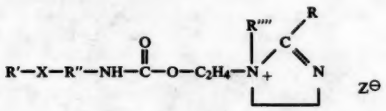
Albert A. Kveglis, Pine Brook, and Arnold H. Gruben, Cedar Grove, both of N.J., assignors to Sun Chemical Corporation, Fort Lee, N.J.

Continuation-in-part of Ser. No. 190,623, May 5, 1988, abandoned. This application Apr. 13, 1989, Ser. No. 337,509

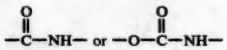
Int. Cl.[4] C07D *233/14*

U.S. Cl. 548—354 8 Claims

1. A quaternized oligourethane having the formula:

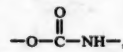


wherein X represents the radical

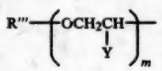


such that when X is

R′ is an ester resulting from the reaction of a C_2–C_{18} hydroxyalkanoic acid or a C_3–C_{18} hydroxyalkenoic acid and rosin, and when X is



R′ is a C_3–C_{18} linear or branched alkyl, phenyl, alkaryl, aralkyl, cycloalkyl or the radical



wherein

Y is hydrogen or methyl, R‴ is a C_1–C_6 alkyl and m is an integer of 1 to 20;

R is a C_{11}–C_{17} linear or branched alkyl, alkenyl, alkynyl or cycloalkyl;

R″ is a C_6–C_{14} linear or branched alkyl, phenyl, alkaryl, aralkyl or cycloalkyl or a dimer or trimer thereof;

R⁗ is hydrogen or a C_1–C_4 linear or branched alkyl; and

Z is R⁗OSO_3, Cl, Br, I, NO_3R⁗SO_3, $(R''''')_{3-n}H_nPO_4$ or $(R''''')_{3-n}H_nPO_3$

wherein n is an integer of 0 to 3, and R⁗′ is phenyl, CF_3, C_1–C_4 linear or branched alkyl or C_7–C_{12} aralkyl or alkaryl.

4,882,437

SUBSTITUTED 5-AMINO-1-PHENYLPYRAZOLES

Reinhold Gehring, Wuppertal; Erich Klauke, Odenthal; Otto Schallner, Monheim; Jörg Stetter, Wuppertal; Hans-Joachim Santel, Cologne, and Robert R. Schmidt, Bergisch-Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

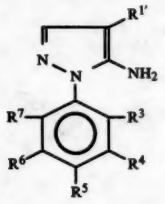
Continuation of Ser. No. 947,667, Dec. 30, 1986, Pat. No. 4,791,212, which is a division of Ser. No. 947,665, Dec. 30, 1986, Pat. No. 4,770,693, which is a division of Ser. No. 659,731, Oct. 11, 1984, Pat. No. 4,668,280. This application Sep. 23, 1988, Ser. No. 248,890

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1983, 3337543; Jun. 6, 1984, 3420985

Int. Cl.[4] C07D *231/38*

U.S. Cl. 548—362 1 Claim

1. A 5-aminopyrazole of the formula



in which

$R^{1'}$ represents alkoxycarbonyl, alkenyloxycarbonyl or alkinyloxycarbonyl with in each case up to 4 carbon atoms in the individual hydrocarbyl parts and

R^3, R^4, R^5, R^6 and R^7, which are identical or different, represent hydrogen, halogen, cyano, nitro, alkyl, alkoxy, alkylsulphonyl, alkoxycarbonyl with up to 4 carbon atoms in the particular alkyl parts or a radical —(X)—R^8, wherein

X represents sulphur, sulphinyl or sulphonyl,

R^8 represents halogenoalkyl with up to 4 carbon atoms and up to 9 halogen atoms,

with the proviso that at least one of the radicals R^3, R^4, R^5, R^6 or R^7 represents a radical —(X)—R^8.

4,882,438

PHOTOCHROMATIC COMPOUNDS

Takashi Tanaka, Shinnanyo; Satoshi Imura, Tokuyama, and Yasuji Kida, Kudamatsu, all of Japan, assignors to Tokuyama Soda Kabushiki Kaisha, Yamaguchi, Japan

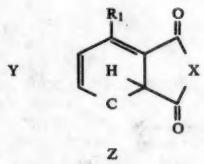
Filed Nov. 8, 1988, Ser. No. 268,497

Claims priority, application Japan, Nov. 10, 1987, 62-282131; Nov. 11, 1987, 62-283116; Apr. 2, 1988, 62-80250

Int. Cl.[4] C07D *307/60, 405/06;* C09K *9/00*

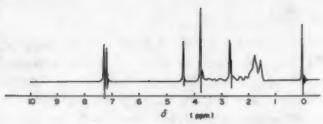
U.S. Cl. 548—407 15 Claims

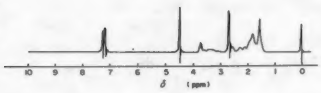
1. A compound represented by the following general formula [I]

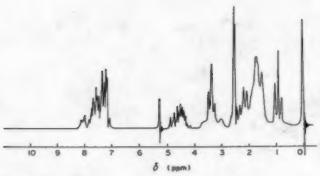


[I]

wherein







Y

represents a divalent aromatic hydrocarbon group or a divalent unsaturated heterocyclic group each of which may have a substituent,

R_1 represents a monovalent hydrocarbon group or a monovalent heterocyclic group each of which may have a substituent,

Z

represents a norbornylidene group or an adamantylidene group each of which may have a substituent, and

X represents an oxygen atom, the group $>N\text{-}R_2$, the group $>N\text{-}A_1\text{-}B_1\text{—}A_2\text{—}_m\text{—}B_2\text{—}_nR_3$, the group $>N\text{-}A_3\text{-}A_4$, or the group $>N\text{-}A_3\text{-}R_4$, provided that when

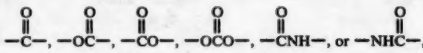
Z

is an adamantylidene group, X is selected from the above groups excepting the oxygen atom and the group $>N\text{-}R_2$, in which

R_2 represents a hydrogen atom, an alkyl group having 1 to 20 carbon atoms, or an aryl group having 6 to 10 carbon atoms,

A_1 and A_2 are identical or different and each represents an alkylene group having 1 to 10 carbon atoms, an alkylidene group having 2 to 10 carbon atoms, a cycloalkylene group having 3 to 10 carbon atoms or an alkylcycloalkanediyl group having 6 to 10 carbon atoms,

B_1 and B_2 are identical or different, and each represents —O—,



m and n, independently from each other, represent 0 or 1, provided that when m is 0, n is also 0,

R_3 represents an alkyl group having 1 to 10 carbon atoms, a naphthyl group or a naphthylalkyl group having 1 to 4 carbon atoms in the alkyl moiety, the alkyl group having 1 to 10 carbon atoms being optionally substituted by 1 to 3 atoms or groups selected from the class consisting of halogen atoms, cyano groups and nitro groups, and the naphthyl or naphthylalkyl group being optionally substituted by 1 to 3 atoms or groups selected from the class consisting of halogen atoms, cyano groups, nitro groups, alkylamino groups having 1 to 3 carbon atoms, alkyl groups having 1 to 3 carbon atoms and alkoxy groups having 1 to 3 carbon atoms,

A_3 represents an alkylene group having 1 to 10 carbon atoms, an alkylidene group having 2 to 10 carbon atoms, a cycloalkylene group having 3 to 10 carbon atoms, or an alkylcycloalkanediyl group having 6 to 10 carbom atoms,

A_4 represents a naphthyl group which may be substituted by 1 to 3 atoms or groups selected from the class consisting of halogen atoms, cyano groups, nitro groups, alkylamino groups having 1 to 3 carbon atoms, alkyl groups having 1 to 3 carbon atoms and alkoxy groups having 1 to 3 carbon atoms, and

R_4 represents a halogen atom, a cyano group or a nitro group.

4,882,439

STEROID INTERMEDIATES

David N. Jones, Sheffield, United Kingdom, assignor to The University of Sheffield, Sheffield, England

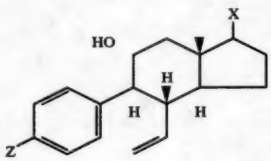
Filed Sep. 19, 1986, Ser. No. 910,526

Claims priority, application United Kingdom, Sep. 19, 1985, 8523184; Jun. 28, 1986, 8615850

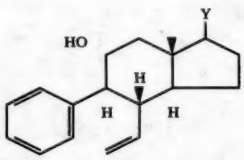
Int. Cl.[4] C07D *317/12;* **C07C** *49/297, 33/12*

U.S. Cl. 549—336 **1 Claim**

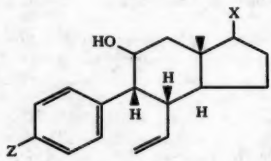
1. A compound having the formula



(2)

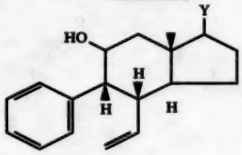


(2A)



(4)

-continued



(4A)

where X represents =O,

or beta orientated

Y represents =O,

beta orientated

or beta orientated OH, Z represents alkoxy and R' represents alkyl.

4,882,440

FORSKOLIN INTERMEDIATES

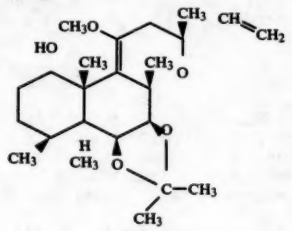
Nicholas J. Hrib, Somerville, N.J., assignor to Heochst-Roussel Pharmaceuticals, Inc., Somerville, N.J.

Division of Ser. No. 147,476, Jan. 25, 1988, Pat. No. 4,820,826, which is a division of Ser. No. 846,550, Mar. 31, 1986, Pat. No. 4,734,513. This application Jan. 25, 1989, Ser. No. 300,880

Int. Cl.[4] C07D *311/78*

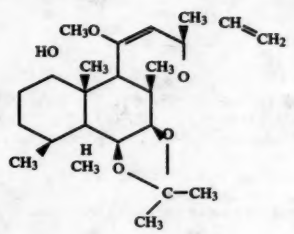
U.S. Cl. 549—383 **2 Claims**

1. The compound having the formula



which is 9,11-dehydro-8,13-epoxy-11-methoxy-1α,6β,7β-trihydroxylabd-14-ene-6,7-dimethyl acetal.

2. The compound having the formula



which is 11,12-dehydro-8,13-epoxy-11-methoxy-1α,6β,7β,9α-tetrahydroxylabd-14-ene-6,7-dimethyl acetal.

4,882,441

LOWER-ALKYL OR ARYL-SULFONYL UNSATURATED TACOPHEROLS

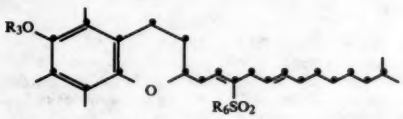
David L. Coffen, Glen Ridge, N.J.; Rudolf Schmid, Munchenstein, Switzerland, and Mark J. Sebastian, Plainfield, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 030,798, Mar. 27, 1987, Pat. No. 4,789,750. This application Sep. 9, 1988, Ser. No. 242,239

Int. Cl.[4] C07D *311/72*

U.S. Cl. 549—407 **5 Claims**

1. A compound of the formula



wherein R_3 taken together with its attached oxygen atom forms an ether hydroxy protecting group; the dotted bond forms a double bond or is hydrogenated to form a single bond; and R_6 is lower alkyl or aryl.

4,882,442

PROCESS FOR THE PRODUCTION OF EPOXIDES

Wolfgang Edl, Grosshesselohe, and Günter R. Sienel, Ebenhausen, both of Fed. Rep. of Germany, assignors to Peroxid-Chemie GmbH, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 790,796, Oct. 24, 1985, abandoned, which is a continuation of Ser. No. 580,787, Feb. 22, 1984, abandoned, which is a continuation of Ser. No. 330,985, Dec. 15, 1981, abandoned. This application Jan. 27, 1988, Ser. No. 150,004

Claims priority, application Fed. Rep. of Germany, Dec. 30, 1980, 3049434

Int. Cl.[4] C07D *301/12*

U.S. Cl. 549—525 **20 Claims**

1. A process for the production of an acid labile epoxide by reaction of one mole equivalent of the corresponding olefin with 1 to 1.6 moles equivalent of an aliphatic percarboxylic acid mixture of an aliphatic percarboxylic acid selected from the group consisting of peracetic acid, perpropionic acid, and perbutyric acid with a carboxylic acid corresponding to the percarboxylic acid and at least one strong acid; the process comprising: neutralizing said strong acid in the percarboxylic acid mixture with 1.0 to 1.785 equivalents of an inorganic base or a basic alkali or alkaline earth salt of said carboxylic acid, and thereafter combining the percarboxylic acid mixture with a reaction mixture containing said olefin in solvent in an amount sufficient to insure that the reaction mixture can be stirred, and about 0.5 to about 0.74 equivalents acid-binding agent with reference to the amount of total carboxylic acid

present in said percarboxylic acid mixture while maintaining the temperature at −20° to 60° C.

4,882,443

ALKYLENE OXIDES PRODUCTION FROM C7 TO C22 OLEFINS USING MOLTEN NITRATE SALT CATALYST

B. Timothy Pennington, Sulphur, La., assignor to Olin Corporation, Cheshire, Conn.

Continuation-in-part of Ser. No. 929,552, Nov. 12, 1986, Pat. No. 4,785,123. This application Aug. 31, 1988, Ser. No. 238,654
The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.
Int. Cl.[4] C07D *301/06*
U.S. Cl. 549—532 **15 Claims**

1. A process for producing an alkylene oxide or mixture of alkylene oxides by a reaction which comprises reacting an olefin having from 7 to 22 carbon atoms per molecule, or mixture thereof, with an oxygen-containing gas, said olefin and said oxygen-containing gas being gaseous reactants, by contacting said gaseous reactants with a bath, stream, spray or mist of at least one molten nitrate salt catalyst, and optionally a co-catalyst, and said catalyst being present in an amount sufficient to absorb any heat generated during said reaction while maintaining an essentially constant reaction temperature, said reaction being conducted at a reaction temperature of between about 135° C. and about 600° C. and a reaction pressure of between about 1 and about 50 atmospheres.

4,882,444

CHEMICAL REACTOR AND PROCESS

Brian Dobson; Peter J. M. Whyman, both of Cleveland; Ralph J. Doy, Saltburn-by-the-Sea; Manfred O. Engel, and Raymond Davies, both of Cleveland, all of England, assignors to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 447,942, Dec. 8, 1982, abandoned. This application Aug. 12, 1985, Ser. No. 764,973
Claims priority, application United Kingdom, Dec. 14, 1981, 8137683
Int. Cl.[4] C07D *301/10*
U.S. Cl. 549—534 **7 Claims**

1. A process for carrying out an exothermic chemical reaction between gaseous reactants in a fixed catalyst bed through which the reactants flow in a flow direction whereby the entering reactants are in a cooler portion of the bed relative to a hotter portion where the exothermic reaction occurs, said process comprising: heating the cooler portion of the bed with a heated heat exchange fluid passed through a first group of heat exchanger tubes extending through the cooler portion of the bed in a direction transverse to said flow direction; then passing the heat exchange fluid from said first group of heat exchanger tubes to a second group of heat exchanger tubes extending through the hotter portion of the bed in a direction transverse to said flow direction to cool said hotter portion and to heat the heat exchange fluid, thereby providing said heated heat exchange fluid which is passed through said first group of tubes.

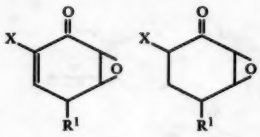
4,882,445

ANTITUMOR CYCLOHEXANONE COMPOSITIONS AND DERIVATIVES THEREOF

Tatsuo Higa, Okinawa, Japan, and Paul J. Scheuer, Honolulu, Hi., assignors to Harbor Branch Oceanographic Institution, Inc., Ft. Pierce, Fla.

Continuation of Ser. No. 817,136, Jan. 8, 1986, abandoned. This application Dec. 30, 1987, Ser. No. 139,773
Int. Cl.[4] C07D *303/00*
U.S. Cl. 549—546 **12 Claims**

1. A compound according to one of the formulae:



wherein:
X is halogen
R^1 is —OH, —OCOR or —OR and
R is 1 to 4 carbon alkyl.

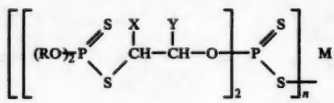
4,882,446

METAL DIHYDROCARBYL-DITHIOPHOSPHYL-DITHIOPHOSPHATES THEIR MANUFACTURE AND USE AS ADDITIVES FOR LUBRICANTS

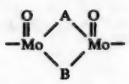
Maurice Born, Nanterre; Jacques Lallement, Aubervilliers; Pierre Marchand, Orgeval; Guy Parc, Rueil Malmaison, and Nicole Thevenin, Paris, all of France, assignors to Institut Francais Du Petrole, Rueil Malmaison, France

Continuation-in-part of Ser. No. 904,082, Sep. 4, 1986, Pat. No. 4,766,228. This application Mar. 3, 1988, Ser. No. 163,433
Claims priority, application France, Sep. 4, 1985, 85 13236
The portion of the term of this patent subsequent to Aug. 23, 2005, has been disclaimed.
Int. Cl.[4] C07F *11/00*
U.S. Cl. 556—25 **9 Claims**

1. A compound of metal dihydrocarbyl-dithiophosphyl-dithiophosphate type, represented by the general formula:



wherein R is at least one monovalent substantially hydrocarbon-containing radical of 1 to 30 carbon atoms; X and Y are each a hydrogen atom or a substantially hydrocarbon-containing radical of 1 to 30 carbon atoms and may be optionally interconnected to form a polymethylene chain, M is a molybdenum complex group of the formula:



wherein A and B are atoms selected from the group consisting of oxygen and sulfur; and n is 2.

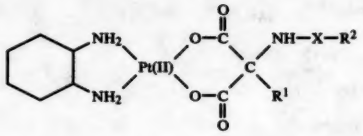
4,882,447

NOVEL ORGANIC PLATINUM COMPLEX AND PROCESS FOR THE PREPARATION THEREOF

Kenji Tsujihara, Urawa; Yoshihisa Arai, Funabashi; Osamu Ohtsuki, Nagaokakyo, and Tadashi Nakatani, Takatsuki, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

Filed Feb. 19, 1988, Ser. No. 157,969
Claims priority, application Japan, Feb. 20, 1987, 62-38240
Int. Cl.[4] C07F *9/68*
U.S. Cl. 556—40 **5 Claims**

1. An organic platinum complex of the formula:



(I)

wherein

R^1 is selected from hydrogen and lower alkyl of 1 to 3 carbon atoms,

R^2 is selected from lower alkyl, lower hydroxyalkyl and a group of the formula: $-CH_2O(CH_2CH_2O)_mCH_3$,

X is carbonyl group,

m is an integer of 1.

4,882,448

SI,SI'DIORGANYL-N-ALKYL-TETRACHLORO-DISILAZANES AND A PROCESS FOR THEIR PREPARATION

Tilo Vaahs, Kelkheim, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Dec. 2, 1988, Ser. No. 279,414

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1987, 3741060

Int. Cl.[4] C07F 7/10

U.S. Cl. 556—412 **9 Claims**

1. A process for the preparation of an Si,Si'-diorganyl-N-alkyl-tetrachloro-disilazane of the formula $RSiCl_2—NR'—SiCl_2R$, in which R is C_1–C_4-alkyl, vinyl or phenyl and R' is C_1–C_4-alkyl, which comprises reacting an organyltrichlorosilane $RSiCl_3$ and a monoalkylamine $R'NH_2$, in which R and R' have the meaning given, with one another in an aprotic solvent at a temperature of −10° C. to +70° C., the molar ratio of $RSiCl_3$:$R'NH_2$ being at least 0.3:1.

4,882,449

CALIXARENE DERIVATIVES, AND USE OF SUCH COMPOUNDS FOR SEQUESTRATION OF METALS

Stephen J. Harris, Dublin, Ireland, assignor to Loctite Corporation, Newington, Conn.

Continuation-in-part of Ser. No. 870,677, Jun. 4, 1986, Pat. No. 4,699,966, and a continuation-in-part of Ser. No. 825,012, Jan. 31, 1986, Pat. No. 4,695,615, which is a continuation of Ser. No. 717,251, Mar. 28, 1985, Pat. No. 4,642,362. This application Mar. 2, 1987, Ser. No. 20,918

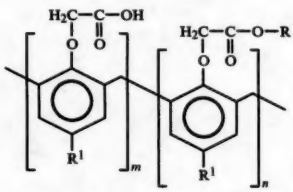
Claims priority, application Ireland, Mar. 7, 1986, 596/86; Aug. 29, 1986, 2319/86

Int. Cl.[4] C07F 7/10

U.S. Cl. 556—419 **11 Claims**

1. Nitrogen-containing calixarene derivatives selected from the group represented by the forumlae:

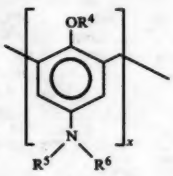
I



and

-continued

II



wherein

m+n=4, 6, or 8

n=an integer 1–8

m=an integer 0–7

x=4, 6 or 8

R^1 is H, alkyl, aralkyl, alkoxy, aroyl, or alkoyl,

R is aliphatic or aromatic, unsubstituted or substitied hydrocarbyl containing nitrogen,

R^4 is unsubstituted or substituted hydrocarbyl, carbonyl or aryl;

R^5 and R^6 (which may be the same or different) are hydrogen, or unsubstituted or substituted hydrocarbyl.

4,882,450

POLYSILANES

Roberto Bortolin, Brighton, United Kingdom, assignor to Dow Corning Limited, London, England

Filed Dec. 3, 1987, Ser. No. 128,243

Claims priority, application United Kingdom, Dec. 11, 1986, 8629593

Int. Cl.[4] C07F 7/08

U.S. Cl. 556—430 **11 Claims**

1. A polysilane of the general formula (RSi)n wherein each R is independently selected from the group consisting of alkyl, aryl, alkaryl and aralkyl groups having from 4 to 18 carbon atoms and n has a value of at least 8.

4,882,451

OPTICALLY ACTIVE COMPOUNDS AND PROCESS FOR PRODUCING THEREOF

Naoyuki Yoshida, Yokohama; Masakazu Kaneoya, and Manabu Uchida, both of Kawasaki, all of Japan, assignors to Chisso Corporation, Osaka, Japan

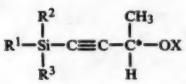
Filed May 2, 1988, Ser. No. 189,162

Claims priority, application Japan, May 15, 1987, 62-116776

Int. Cl.[4] C07F 7/08, 7/18

U.S. Cl. 556—440 **4 Claims**

1. An optically active R- or S-compound represented by the general formula:



(I)

wherein R^1, R^2 and R^3 are selected from alkyl groups having 1–4 carbon atoms and phenyl groups, X is selected from a hydrogen atom and

is selected from alkyl groups having 1–20 carbon atoms, and C* indicates an asymmetric carbon atom.

4,882,452

PROCESS FOR THE PREPARATION OF IFOSFAMIDE HAVING IMPROVED PROPERTIES

Jürgen Engel, Alzenau; Siegfried Müller, Bad Homburg, and Werner Laubner, Halle, all of Fed. Rep. of Germany, assignors to Asta Pharma Akteingesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Mar. 3, 1988, Ser. No. 163,586

Claims priority, application Fed. Rep. of Germany, Mar. 6, 1987, 3707154

Int. Cl.[4] C07F 9/24

U.S. Cl. 558—81 8 Claims

1. Needle-shaped prismatic crystalline ifosfamide characterized by the following properties:

(a) at least 70% of the crystals have a particle size between 150–550 μm, the individual crystals have a ratio of length to width of 3.5:1 to 8:1, and

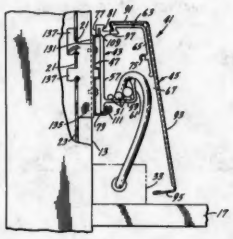
(b) the crystals have a maximum average relative standard deviation or the deviation of the individual values from the desired value at filling tests between 0.90% and 2% of 1.4%.

4,882,453

WIRE MANAGEMENT ASSEMBLY

Daniel B. Chelsea, New York, N.Y., assignor to The Shaw-Walker Company, Muskegon, Mich.

Filed Oct. 5, 1988, Ser. No. 253,572
Int. Cl.[4] H02G 3/24
U.S. Cl. 174—48 5 Claims



5. A wire management assembly for mounting on a vertical supporting surface at a defined distance above a horizontal work surface for supporting and concealing communication wires, power plug-in cords and extension cords of electrical equipment and devices, including:

a housing having a rear wall, a bottom wall with an upturned front lip, a top wall and a front wall forming an enclosure,

said front wall of said housing located outwardly of said bottom wall and expanding downwardly from said top wall to terminate adjacent the upturned lip of said bottom wall to define a downwardly-facing opening into said wire enclosure of said housing,

a cover adapted to be supported on said housing,

said cover being channel-shaped having a top which rests on the top wall of said housing and a front wall which engages and rests on the front wall of the housing and extends downwardly beyond the housing to terminate above said work surface, and

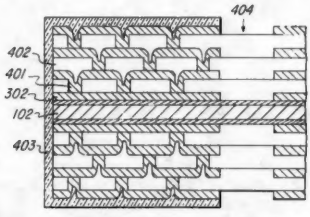
means formed on said housing and said cover to restrain said cover against downwardly and upwardly movement relative to the housing but to release the cover when its bottom is swung outwardly and lifted upwardly.

4,882,454

THERMAL INTERFACE FOR A PRINTED WIRING BOARD

Robert K. Peterson, Garland; Larry J. Mowatt, Allen, and Aaron D. Poteet, Austin, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 12, 1988, Ser. No. 155,462
Int. Cl.[4] H05K 1/00
U.S. Cl. 174—68.5 17 Claims



1. A printed wiring board for mounting components thereto, said printed wiring board including:

a thermally conductive core; and

a first thermal interface region having a first outer surface, said first thermal interface disposed over and in thermal contact with said core for conducting heat generated by said components to said core via said first thermal interface region;

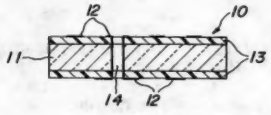
said first thermal interface region having a plurality of interlaced thermally insulating and thermally conductive layers, one of said thermally conductive layers being disposed on said first outer surface, and plural thermally conductive vias, each said via coupled to an adjacent pair of said thermally conductive layers extending from said thermally conductive core to said thermally conductive layer on said first outer surface of said first thermal interface region.

4,882,455

ELECTRONIC CIRCUIT SUBSTRATES

Yasuyuki Sato, Iwai; Shinji Saito, Hashima, and Hidetoshi Yamauchi, Anpachi, all of Japan, assignors to Ibiden Co., Ltd., Japan

Continuation of Ser. No. 106,903, Oct. 9, 1987, abandoned, which is a continuation of Ser. No. 841,825, Mar. 20, 1986, abandoned. This application Aug. 2, 1988, Ser. No. 229,733
Claims priority, application Japan, Mar. 27, 1985, 60-64598; Jul. 26, 1985, 60-166185
Int. Cl.[4] H05K 01/03
U.S. Cl. 174—68.5 15 Claims



1. An electronic circuit, comprising:

a porous ceramic sintered substrate consisting essentially of a crystal structure of a three-dimensional network, crystal grains having an average grain size of not greater than 10 microns, and an initial permeable porosity of 10–70 volume %;

a resin filled in the permeable pores of the porous ceramic sintered substrate; and

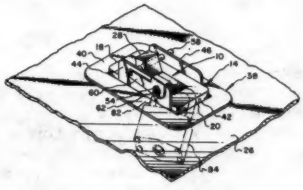
an electrically conducting circuit pattern printed on at least one surface of said substrate.

4,882,456

LOCKING DEVICE FOR ELECTRICAL SWITCH OR CIRCUIT BREAKER HANDLE

Steven F. Hovanic, Barboursville, and David W. Bryce, Charlottesville, both of Va., assignors to Cooper Industries, Inc., Houston, Tex.

Filed Nov. 4, 1985, Ser. No. 795,020
Int. Cl.[4] H01H 9/28
U.S. Cl. 200—43.15 9 Claims



1. A locking device for locking an electrical switch handle in

a predetermined position relative to a switch panel, said switch panel including a surface forming an opening through which said switch handle projects, said switch handle being movable between working positions, said locking device comprising:

a support member including means registrable with means projecting from said surface to substantially prevent movement of said support member in a direction generally parallel to said surface, said support member including means forming a pair of spaced apart flanges adapted to be disposed on opposite sides of said switch handle, said flanges each including openings formed therein;

a locking member operable to extend into said openings in said flanges, respectively, and to be engaged with means on said switch handle to prevent movement of said switch handle relative to said flanges from one predetermined position to another; and

means connected to said locking member and adapted to be secured to at least one of said flanges to secure said locking member in a position for locking said handle to prevent said movement from said one predetermined position to said another.

4,882,457

STEERING COLUMN SWITCH WITH INDIRECTLY GUIDED BRIDGING CONTACTS

Herbert Erdelitsch; Otto Machalitzky, and Horst Rachner, all of Bietigheim-Bissingen, Fed. Rep. of Germany, assignors to SWF Auto-Electric GmbH, Bietigheim-Bissingen, Fed. Rep. of Germany

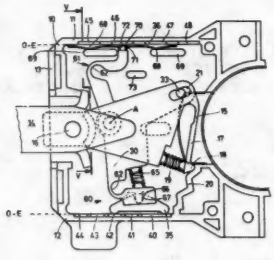
PCT No. PCT/EP87/00408, § 371 Date May 7, 1988, § 102(e) Date May 7, 1988, PCT Pub. No. WO88/01097, PCT Pub. Date Feb. 11, 1988

PCT Filed Jul. 29, 1987, Ser. No. 208,358

Claims priority, application Fed. Rep. of Germany, Aug. 2, 1986, 3626242

Int. Cl.[4] H01H *3/16*

U.S. Cl. 200—61.54 **12 Claims**



1. An electric steering column switch for motor vehicles comprising a plurality of stationary contacts, a switch lever, a switch member swivellable by said switch lever around an axis of rotation into a plurality of switching positions, said switch member carrying a bridging contact guided by a switching arm and resiliently urged onto contact areas of different ones of said stationary contacts in different switching positions, wherein said switching arm is swivellably attached to the switch member for movement around an axis parallel to the axis of the rotation of the switch member.

4,882,458

SWITCH DEVICE FOR ACTIVATING AND DEACTIVATING AN ELECTRICALLY OPERATED DRIVING MEMBER OF AN APPLIANCE

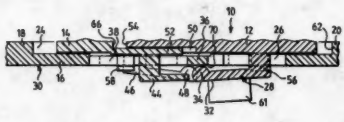
Anette Berg, Kronberg, and Günter Hoffmann, Hofheim, both of Fed. Rep. of Germany, assignors to Braun Aktiengesellschaft, Kronberg, Fed. Rep. of Germany

Filed Aug. 2, 1988, Ser. No. 227,150

Claims priority, application Fed. Rep. of Germany, Aug. 21, 1987, 3727921

Int. Cl.[4] H01H *3/20, 9/20*

U.S. Cl. 200—52 R **15 Claims**



1. A switch device for an appliance for personal use, comprising an appliance switch actuator movable along a straight line path for activating and deactivating a driving member capable of being electrically operated in a housing of the appliance, as well as a locking device movable in a path parallel to said path of movement of said appliance switch actuator into the actuation path of the appliance switch actuator, said appliance switch actuator and said locking device including engagement means which are interengageable for securing said appliance switch actuator relative to said locking device in the off position.

4,882,459

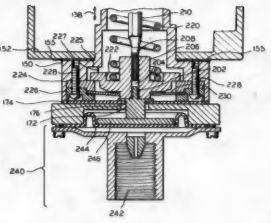
PRESSURE SENSITIVE SWITCH HAVING RUGGED CONSTRUCTION AND ACCURATE TRIP PRESSURE SETTINGS

Stanley H. Edwards, Jr., Asheville; Simon S. Smith, Jr., Fairview, and James B. Warren, Arden, all of N.C., assignors to Square D Company, Palatine, Ill.

Continuation of Ser. No. 132,616, Nov. 2, 1987, abandoned, which is a continuation of Ser. No. 850,312, Apr. 10, 1986, abandoned. This application Dec. 9, 1988, Ser. No. 282,883

Int. Cl.[4] H01H *35/34*

U.S. Cl. 200—83 J **18 Claims**



1. A fluid pressure sensitive switch comprising:

first means for producing linear motion in response to fluid pressure;

second means, including a spring and a spring seat, for springably resisting said linear motion;

third means operating said switch after a predetermined linear motion; and

a lifter pin means for decoupling rotational movement of said first means for said spring seat, and having a shoulder engaging said spring seat and a projection on said shoulder which loosely protrudes through, a hole in said spring seat said lifter pin means being mounted between said first

means and said spring seat so as to transmit linear force from said first means to said second means without transmitting rotational forces.

4,882,460

HORN OPERATING MEANS FOR A MOTOR VEHICLE STEERING WHEEL HAVING TWO CONTACT PLATES SOLELY SEPARATED BY A FOAM SHEET AND CONTACTABLE AT SPACED POINTS WITH SUBSTANTIALLY UNIFORM PRESSURE

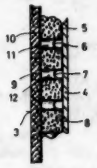
Theobald Mertens, Mainz, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 10, 1988, Ser. No. 167,280

Claims priority, application Fed. Rep. of Germany, Apr. 6, 1987, 3711822

Int. Cl.[4] H01H *1/10*

U.S. Cl. 200—512 **2 Claims**



1. A horn operating mechanism for a steering wheel of a motor vehicle, comprising two contact plates which are separated from each other solely by a resilient perforated foam sheet at least substantially co-extensive therewith, one contact plate being provided with projections directed towards the other contact plate, apertures in the foam sheet exposing the projections to said other contact plate and said other contact plate being elastically deformable by human hand manipulated pressure applied to said other contact plate at points opposite said projections to effect contact of said projections respectively with said other contact plate, characterized by force reducing means located in a central region of and formed integral with one of said contact plates and foam sheet parts for reducing the pressure that would otherwise be required to act on said other plate in a central region thereof to effect contact with said projections in said central region, said force reducing means comprising apertures in the central region of said foam sheet that are larger than those apertures in an edge region of said foam sheet.

4,882,461

SUBMINIATURE PUSH-BUTTON SWITCH

Koji Kamisada, Tokyo, Japan, assignor to Nihon Kaiheiki Industrial Company Ltd., Tokyo, Japan

Continuation of Ser. No. 53,663, May 26, 1987, abandoned. This application Jul. 29, 1988, Ser. No. 227,418

Claims priority, application Japan, Jun. 24, 1986, 61-095332

Int. Cl.[4] H01H *13/52*

U.S. Cl. 200—536 **12 Claims**

1. A subminiature push-button switch comprising:

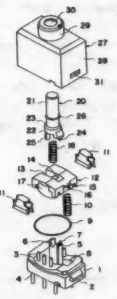
a switch base having a plurality of fixed contacts secured thereto and a central portion;

an upstanding bar-shape projection provided on said switch base at said central portion, said upstanding bar-shape projection having a distal end opposite to said switch base, said distal end having a first engagement section;

a pivot block placed upon said upstanding bar-shape projection, said pivot block having a vertical through groove at a central portion thereof and a second engagement section positioned at an upper part of said vertical through groove, said pivot block being pivotally supported on said distal end of said projection by inserting said upstanding bar-shape projection into said vertical through groove until said first engagement section engages with said second engagement section such that a lower part of said pivot block opposite to said second engagement swings toward and away from said upstanding bar-shape projection;

at least one movable contact attachable to said pivot block;

a vertically movable plunger for rocking said pivot block from side to side, said at least one movable contact being rocked from side to side in response to a swing motion of said pivot block;



a first spring means provided immediately under said plunger and above said second engagement section for urging said plunger away from said pivot block and for preventing said first and second engagement sections from disengaging from each other in a manner such that said first spring substantially does not swing along with the swing movement of said pivot block; and

a second spring means for urging said pivot block to generate rocking motion, wherein said plunger, first spring means and said upstanding bar-shape projection are coaxially aligned.

4,882,462

CONTROL APPARATUS FOR HEATING, DEFROSTING AND/OR COOKING FOODS WITH MICROWAVE ENERGY

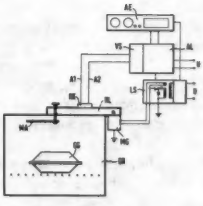
Julius Husslein, Vachendorf; Helmut Hess, and Wolfgang Beifuss, both of Traunreut, both of Fed. Rep. of Germany, assignors to Bosch-Siemens Hausgeräte GmbH, Munich, Fed. Rep. of Germany

Filed Dec. 22, 1988, Ser. No. 288,696

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1987, 3743921

Int. Cl.[4] H05B *6/68*

U.S. Cl. 219—10.55 B **6 Claims**



1. Microwave heating apparatus for heating foods to be heat-treated by exposure to microwave energy at a given location inside a closed cooking chamber, having a heating, defrosting and/or cooking mode comprising a microwave

generator for beaming microwave energy into the cooking chamber, a sensor for detecting the state of the food and controlling the energy beamed into the cooking chamber, said sensor disposed in the cooking chamber between said microwave generator and the given location for food exposed to microwave energy, for detecting a value for microwave energy potential and for controlling the output of the microwave generator, a rotating microwave antenna in the cooking chamber, an output control device connected to said microwave generator for controlling said microwave generator output, and a logic control circuit connected between said sensor and said output control device for controlling said output control device in dependence on the state of the food as detected by said sensor, wherein said logic control circuit operates to reduce the microwave energy during the defrost mode for a limited period of time and subsequently switches it on again for a period of time as determined by said sensor in the course of change in the field intensity of the microwave energy during thawing of the surface of the food.

4,882,463

FOOD VESSEL USING HEATING ELEMENT FOR MICROWAVE OVEN

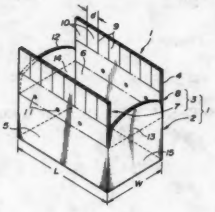
Nobuo Kyougoku, and Hitoshi Harada, both of Osaka, Japan, assignors to Suntory Limited, Osaka, Japan

Filed Oct. 26, 1988, Ser. No. 262,977

Claims priority, application Japan, Oct. 30, 1987, 62-275410

Int. Cl.[4] H05B *6/80*

U.S. Cl. 219—10.55 E **32 Claims**



1. A food vessel for baking an expandable food in a microwave oven comprising:

providing an expandable food product;

a heat resistant vessel body having an opening and a lid for covering said opening containing said expandable food, said body allowing said expandable food to expand therein; and

a heating means including heating element which is arranged on the inner surfaces of said vessel body and said lid, operative to maintain contact with the outer surface of said expandable food during expansion thereof to obtain a uniform browned surface, said heating means being responsive to irradiation of microwaves by said oven to generate heat for baking said expandable food in said vessel body.

4,882,464

ELECTRICAL DISCHARGE MACHINING EQUIPMENT

Haruki Obara, Kanagawa, Japan, assignor to Fanuc Ltd, Minamitsuru, Japan

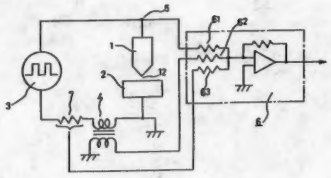
PCT No. PCT/JP87/00892, § 371 Date Oct. 5, 1988, § 102(e) Date Oct. 5, 1988, PCT Pub. No. WO88/04211, PCT Pub. Date Jun. 16, 1988

PCT Filed Nov. 18, 1987, Ser. No. 251,216

Claims priority, application Japan, Dec. 11, 1986, 61-293551

Int. Cl.[4] B23H *1/02*

U.S. Cl. 219—69.13 **7 Claims**



1. An electrical discharge machining apparatus for machining a workpiece, comprising:

a machining electrode;

electric discharge gap voltage sensing means for sensing a gap voltage across a machining gap between said machining electrode and the workpiece;

high frequency pulse voltage generating means for supplying high frequency voltage pulses across the machining gap;

electric current variation rate sensing means for determining an inductance fall component by sensing an electric current variation rate across the machining gap;

machining current resistance fall component sensing means for determining a resistance fall component by sensing the intensity of the electric current flowing in the machining gap; and

correcting means for correcting the sensed gap voltage by compensating for the inductance fall component and the resistance fall component.

4,882,465

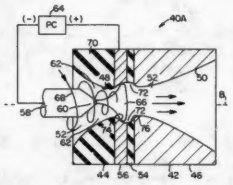
ARCJET THRUSTER WITH IMPROVED ARC ATTACHMENT FOR ENHANCEMENT OF EFFICIENCY

William W. Smith, and Steven C. Knowles, both of Seattle, Wash., assignors to Olin Corporation, Stamford, Conn.

Filed Oct. 1, 1987, Ser. No. 103,471

Int. Cl.[4] B23K *9/00*

U.S. Cl. 219—121.48 **14 Claims**



1. In an arcjet thruster, the combination comprising:

(a) means forming an annular-shaped constrictor and an annular-shaped nozzle being tandemly-arranged and having respective interior surfaces which together define an arc chamber, said constrictor defining a subsonic-to-supersonic transition zone axially coextensive with its interior surfaces;

(b) a first annular-shaped portion of said constrictor being electrically insulative to define an insulator;

(c) a second annular-shaped portion of said constrictor being electrically conductive to define an anode being disposed side-by-side with said insulator and located upstream therefrom, said insulator and anode being axially coextensive with and disposed along said transition zone defined by said constrictor;

(d) an elongated member having a tip disposed adjacent to and spaced upstream from said constrictor anode, said member being electrically conductive to define a cathode spaced from said anode by a gap generally coextensive with said arc chamber; and

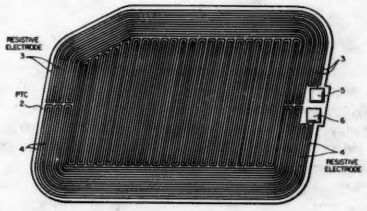
(e) means for applying an electrical potential to said anode and cathode so as to generate an electrical arc in said arc chamber from said cathode to said anode which produces thermal heating of propellant gases flowing through said transition zone of said constrictor and expansion thereof through said nozzle, the disposition of said insulator downstream from said anode causing diffusion and attachment of said electrical arc to occur at the region of said anode in said transition zone of said constrictor and preventing movement of said arc diffusion and attachment region downstream past said insulator to said nozzle in response to propellant gas mass flow variations through said constrictor.

4,882,466

ELECTRICAL DEVICES COMPRISING CONDUCTIVE POLYMERS

Kevin J. Friel, San Mateo, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Filed May 3, 1988, Ser. No. 189,938
Int. Cl.[4] H05B *3/14*
U.S. Cl. 219—219 **20 Claims**



20. A heated mirror for use on vehicles, which comprises

(1) a mirror comprising a front mirrored surface and a back surface; and

(2) attached to the back surface of the mirror, a heater which comprises

(a) a laminar resistive element which is composed of a conductive polymer composition which exhibits PTC behavior;

(b) two electrodes which can be connected to a source of electrical power and which comprise a material which has a resistivity of 1×10^{-6} to 1×10^{-4} ohm-cm exhibits ZTC behavior, said electrodes

(i) each having a length of 10 to 1000 inches and a width of 0.005 to 1 inch such that the length to width ratio is at least 1000:1,

(ii) each having a thickness of 0.0005 to 0.005 inch,

(iii) each having a resistance, R_e, of 0.1 to 1000 ohms,

(iv) each attached to a flat laminar surface of the resistive element, and

(v) together covering 10 to 90% of the surface area of the resistive element,

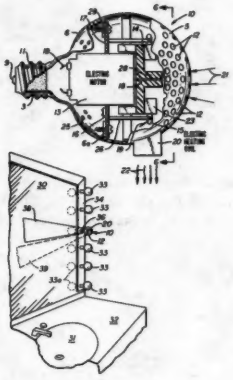
said resistive element having a resistance R_{cp} which is less than R_e and is from 0.1 to 1000 ohms when connected to a source of electrical power and the heater having a resistance R_h, the resistances R_e, R_{cp}, and R_h being measured when the electrodes are first connected to a source of electrical power with the whole device being at a uniform temperature of 23° C.

4,882,467

ELECTRIC WARM AIR MIRROR DEFOGGING DEVICE

Keene P. Dimick, 3076 Redwood Rd., Napa, Calif. 94558

Filed Jul. 16, 1987, Ser. No. 74,405
Int. Cl.[4] H05B *1/00*; F24H *3/04*; F21V *33/00*; E06B *7/12*
U.S. Cl. 219—219 **16 Claims**



1. A mirror defogging device comprising:

a globular pseudo light bulb-type housing having a central axis;

an electrical plug base fixedly extending from said housing along said central axis for connection to an electrical lamp socket adjacent a mirror surface; and wherein

said globular housing includes an air inlet extending through a surface thereof, a resistance heater in said housing, a rotating fan within said housing, a motor in said housing for rotating said fan, said air inlet, heater, fan and motor being axially aligned along said central axis of said housing, and an air outlet laterally offset from said central axis, extending through said housing and in exit flow communication with said fan such that air entering said housing through said inlet is heated and directed by said fan to said outlet for discharge laterally to a mirror surface.

4,882,468

FOUR ELECTRIQUE NOTAMMENT POUR TRAITEMENT THERMIQUE

Jean C. M. Bouchon, Meylan, France, assignor to La Physique Appliquee Industrie, Pariset, France

Filed Sep. 2, 1988, Ser. No. 240,771
Claims priority, application France, Sep. 4, 1987, 87 1216
Int. Cl.[4] H05B *3/62*
U.S. Cl. 219—400 **13 Claims**

1. An electric furnace for heat treatment of a workpiece constituting a charge, said furnace comprising:

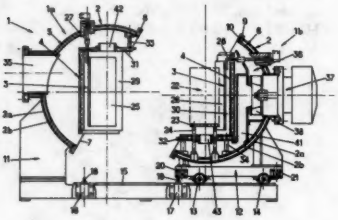
an outer casing having two complementary parts adapted to be coupled and movable relative to each other between coupled and uncoupled positions;

at least one support for said charge, said support being carried by a first part of said casing;

the furnace having two parts, a first furnace part comprising said first part of said outer casing and the charge support carried thereon and a second furnace part comprising a second part of said outer casing;

and means for displacing said two parts of the furnace relative to each other in a horizontal direction laterally between said coupled and uncoupled positions;

the coupling edges of the second part of the furnace being outside a path of the charge and the charge support of the first part of the furnace when the furnace parts are moved relative to each other;



said second part of the furnace in coupled position extending laterally above the charge support so that vertical access to the charge support in the first part of the furnace is free when the two furnace parts are uncoupled, whereby said workpiece can be vertically charged to and discharged from said furnace.

4,882,469

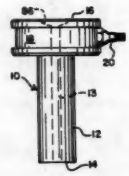
INTERNALLY HEATED SPRUE BUSHING ASSEMBLY WITH A UNITARY BUSHING CASING CORE ELEMENT

Panos Trakas, 21 W. Wrightwood, Glendale Heights, Ill. 60139

Filed Sep. 28, 1988, Ser. No. 250,769

Int. Cl.[4] B29C *45/00*

U.S. Cl. 219—421 21 Claims



1. An internally heated sprue bushing assembly having an inlet for receiving pressurized melt and an outlet for the discharge of said pressurized melt, said sprue bushing assembly comprising:

a unitary bushing casing-core element having an integral outer side wall, an end wall and an elongate inner core, the outer surface of said elongate inner core and the inner surface of said side wall defining a generally annular compartment within said bushing casing core element;

heating means in surrounding relation to said elongate inner core, said heating means axially extending a preselected length within and occupying a portion of said annular compartment;

a compacted unified mass of particulate material occupying the remainder of said annular compartment; and

a melt runner passage in said elongate inner core interposed between and in flow communication with said inlet and outlet of said sprue bushing assembly.

4,882,470

BORING DEVICE FOR OPENING PASSAGES TO BRANCH PORTIONS OF A LINED MAIN PIPE LINE

Katsuaki Zenbayashi, Fujisawa; Hisao Otsuga, Yokohama; Akio Morinaga, Fujisawa; Osamu Toyoshima, Takatsuki, and Shinji Shimokawa, Osaka, all of Japan, assignors to Tokyo Gas Kabushiki Kaisha, Tokyo and Ashimori Kogyo Kabushiki Kaisha, Osaka, both of, Japan

PCT No. PCT/JP86/00428, § 371 Date Apr. 19, 1988, § 102(e) Date Apr. 19, 1988, PCT Pub. No. WO88/01222, PCT Pub. Date Feb. 25, 1988

PCT Filed Aug. 19, 1986, Ser. No. 184,489

Int. Cl.[4] H05B *3/54*

U.S. Cl. 219—523 10 Claims

1. A boring device for a lining material for pipe lines which comprises in combination a tension coil spring, a compression coil spring being connected to a tip of said tension coil spring and having a spring constant smaller than that of said tension coil spring, a head element in the form of a circular truncated cone being connected to a tip of the compression coil spring and comprising an electric heat-generating means coated with a thermoplastic resin, a single or plural transmission wires being connected to said electric heat-generating means, passed in a loosened state through said tension coil spring and said compression coil spring, said transmission wires being fixed within said tension coil spring at plural points, and a means provided in a rear of said tension coil spring for rotatably extending said boring device.

4,882,471

ELECTRONIC EQUIPMENT USING A COVER

Tomoko Kai, Urawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 6, 1987, Ser. No. 82,133

Claims priority, application Japan, Aug. 18, 1986, 61-125748[U]

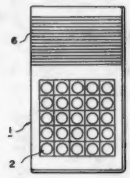
Int. Cl.[4] G06C *5/02*

U.S. Cl. 235—1 D 13 Claims

1. Electronic equipment comprising:

input means arranged on an electronic equipment body for inputting data;

display means arranged on said electronic equipment body for displaying the data;



cover means pivotally arranged on said electronic equipment body for protecting said display means; and

a solar cell arranged on said cover means.

4,882,472

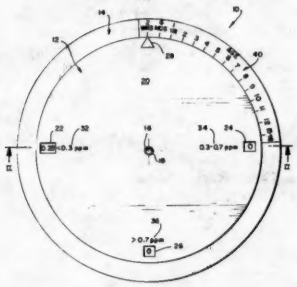
FLUORIDE SUPPLEMENT CALCULATOR

Susan J. Sigman, West Lafayette, and Paula A. Meade, Evansville, both of Ind., assignors to Bristol-Myers Company, New York, N.Y.

Filed Jan. 5, 1989, Ser. No. 293,289

Int. Cl.[4] G06C *3/00*

U.S. Cl. 235—88 R **4 Claims**



1. A fluoride supplement calculator useable to determine a daily fluoride supplement as a function of a person's age and a water supply fluoride level and further useable to depict fluoride uptake during tooth enamelization said fluoride supplement calculator comprising:

a first small disk having an obverse face and a reverse face and a second larger disk having an obverse face and a reverse face;

means for securing said first and second disks together in a concentric manner for relative rotation with respect to each other about a central axis;

a plurality of fluoride level apertures in said first disk and an age scale indicator formed on said obverse face of said first disk, said plurality of fluoride level apertures and said age scale indicator being generally evenly spaced about a peripheral portion of said obverse face of said first disk, each of said fluoride level apertures having a different, water supply fluoride legend associated with it;

an age scale and a plurality of groups of fluoride supplement dosage amounts on said obverse surface of said second disk, said plurality of fluoride level apertures and said plurality of said fluoride supplement dosage amounts being the same, said fluoride dosage amounts underlying and being visible through said fluoride level apertures and said age scale being visible and adjacent said age scale indicator when said first and second disks are secured together, said disks being rotatable relative to each other to align said age scale indicator with the person's age as set forth on said age scale so that an appropriate fluoride dosage amount will be depicted in the one of said plurality of fluoride level apertures which corresponds to the person's water supply fluoride level;

a single aperture in said second disk and a cooperating age indicating pointer on said reverse surface of said second disk; and

a plurality of arrays of teeth and age indicators on said reverse surface of said first disk, said single aperture being sized to facilitate viewing of a selected one of said plurality of arrays of teeth, said age indicating pointer being useable to indicate the age indicator for the selected array of teeth, each of said arrays of teeth depicting a location of fluoride uptake and tooth enamelization appropriate for the age identified by said associated age indicator.

4,882,473

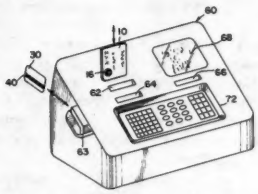
ON-LINE WAGERING SYSTEM WITH PROGRAMMABLE GAME ENTRY CARDS AND OPERATOR SECURITY CARDS

Daniel R. Bergeron, Pawtucket, and Clifton C. Dutton, Providence, both of R.I., assignors to GTECH Corporation, Providence, R.I.

Continuation-in-part of Ser. No. 98,544, Sep. 18, 1987, Pat. No. 4,764,666. This application Aug. 16, 1988, Ser. No. 232,790

Int. Cl.[4] G06K *5/00*

U.S. Cl. 235—380 **19 Claims**



1. An on-line wagering system, comprising:

a central data processor having a central data memory;

a plurality of agent terminals in data communication with the central data processor, the agent terminals being operable to receive player entry data from players and to transmit the player entry data to the central data processor, the central data processor being operable to validate play entries upon receipt of the player entry data and to transmit a validation code to the agent terminals, the player entry data relating to an entry of an individual player in at least one game, the agent terminals having inputs for receiving the player entry data and input/output means for transmitting to the central data processor at least a portion of the player entry data and for receiving the validation data therefrom; and,

a player card issued to the player, the player card being connectable in data communication with at least one of the agent terminals, said at least one of the agent terminals having alternate inputs for receiving at least a portion of the player entry data directly from the card, the alternate inputs being adapted to interface with the player card, the player card having an on-card memory formed by one of: magnetic media; integrated circuit; and, laser optical memory, and operable to store data unique to said individual player and also to store at least one of the player entry data and the validation code.

4,882,474

SECURITY FILE SYSTEM AND METHOD FOR SECURING DATA IN A PORTABLE DATA CARRIER

Ewald C. Anderl, Middletown; Oren Frankel, Ocean Township, Monmouth County, and Avi Zahavi, Highland Park, all of N.J., assignors to American Telephone and Telegraph Company, New York, N.Y. and AT&T Information Systems Inc., Morristown, N.J.

Division of Ser. No. 863,975, May 16, 1986, Pat. No. 4,816,653. This application Feb. 5, 1988, Ser. No. 153,294

Int. Cl.[4] G06F *15/21*; G06K *19/06*

U.S. Cl. 235—380 **13 Claims**

SECURITY LEVEL	USER
6	DEVELOPER
5	SUPER USER (FACTORY)
4	MASTER ISSUER (OWNER)
3	SUB ISSUER
2	USER (CARD HOLDER)
1	PUBLIC (CARD OWNER INFO) (MEDICAL DATA)

1. In a portable data carrier, a security file system containing both a file header region and a file data segment region, the file header region including a unique access code for verifying the identity of an individual attempting to access the data in the portable data carrier, and the file data segment region including a plurality of files for storing alterable data, each of the plurality of files having alterable data associated therewith for storage in any of multiple locations throughout the file data segment region, the portable data carrier comprising:

access means for inputting an externally provided code for accessing the data in the portable data carrier,

counting means responsive to the access means for recording all access attempts, the counting means advancing a count each time the externally provided code is inputted to the portable data carrier,

comparison means for comparing the unique access code with the externally provided code;

verifying means for providing an indication when the externally provided code compares favorably with the unique access code stored in the portable data carrier;

counting reset means for resetting the count advanced by the counting means to its previous count, the counting reset means being activated in response to the verifying means indicating a favorable comparison and data access is permitted, the counting reset means remaining inactive in the absence of the verifying means indicating a favorable comparison.

4,882,475

SYNTHESIZED SPEECH-FACILITATED PRODUCT PREPARATION AND/OR DELIVERY SYSTEM AND METHOD

Phillip Miller, Cedar Rapids; Richard P. Shindley, Marion; Kristi T. Feltz, Iowa City; George E. Hanson, and Jonathan R. White, both of Cedar Rapids, all of Iowa, assignors to PAR Microsystems, Inc., New Hartford, N.Y.

Continuation-in-part of Ser. No. 925,268, Oct. 31, 1986, abandoned. This application Jul. 31, 1987, Ser. No. 80,573

Int. Cl.[4] G06F *15/24*

U.S. Cl. 235—383 **52 Claims**

2. In a method for processing orders for delivery,

(a) establishing customr files with respective customer addresses associated with respective customer telephone numbers;

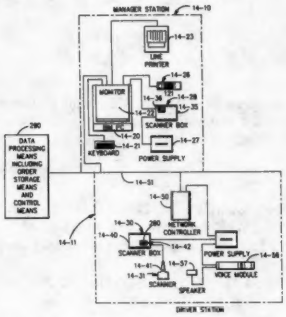
(b) registering a telephone number for each telephone order;

(c) scanning the customer files for an address previously associated with a given telephone number;

(d) registering information concerning incoming telephone orders;

(e) associating an order number with each telephone order;

(f) printing out for each order a label with a machine readable order number and a customer address;



(g) affixing the label with the order;

(h) assigning an order for delivery; and

(i) contemporaneously with such assigning of an order for delivery reading the order number to identify such order as being assigned for delivery.

4,882,476

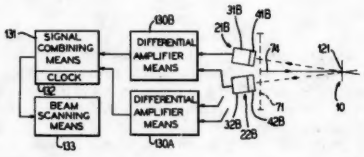
BAR CODE READER WITH ENHANCED SENSITIVITY

Jonathan R. White, Cedar Rapids, Iowa, assignor to Norand Corporation, Cedar Rapids, Iowa

Filed Sep. 10, 1986, Ser. No. 905,779

Int. Cl.[4] G01J *3/34*

U.S. Cl. 235—462 **35 Claims**



2. A bar code reading system according to claim 1, said optical filter means comprising first and second optical filters interposed in the path for reflected light leading to the first and second light sensitive means, respectively, said first and second optical filters having respective offset bandpass spectral properties.

4,882,477

CARD-SHAPED ELECTRONIC APPARATUS WITH EMBOSSED SURFACE AND METHOD OF PRODUCING SAME

Yoshinori Cogita, and Katsuhide Shino, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 171,968, Mar. 23, 1988, abandoned. This application Oct. 26, 1988, Ser. No. 262,968

Claims priority, application Japan, Mar. 24, 1987, 62-44672[U]

Int. Cl.[4] G06K *19/02*

U.S. Cl. 235—488 **8 Claims**

1. In a card-shaped electronic apparatus with an embossed

surface, the improvement wherein said apparatus comprises a planar circuit piece and a film member on said surface, said film member having protrusions formed thereon, and pasted onto

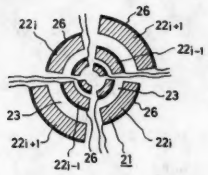
said planar circuit piece, a filler being injected behind said protrusions between said film member and said planar circuit piece.

4,882,478

PHOTOELECTRIC CONVERSION SENSOR WITH SHIFTED ARCUATE ELEMENTS

Shigeru Hayashi; Takasui Saito; Shoji Horiuchi, all of Chofu, and Tadashi Takahashi, Tokyo, all of Japan, assignors to Hideo Nagasu and Tohnichi Computer Applications Co., Ltd., Japan

Filed Mar. 2, 1988, Ser. No. 162,906
Claims priority, application Japan, Mar. 4, 1987, 62-49776
Int. Cl.[4] H01J *40/14*; G01N *21/00*
U.S. Cl. 250—211 R **2 Claims**



1. A photoelectric conversion sensor wherein 8 or more arcuate photoelectric conversion elements are each defined by two concentric arcs with different radii, with adjacent elements in the radial direction shifted in the circumferential direction so that the gaps in the radial direction between adjacent elements in the radial direction are substantially eliminated and there is no substantial overlap in the radial direction between radially adjacent elements.

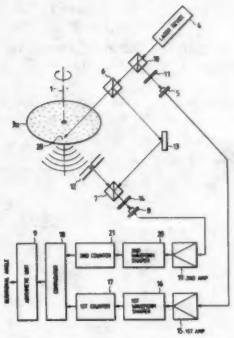
4,882,479

OPTICAL ROTARY ENCODER USING DUAL FREQUENCY BEAT DIFFERENCE

Motohito Hino, Nagoya, and Yoshinori Bessho, Age, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Oct. 21, 1988, Ser. No. 260,569
Claims priority, application Japan, Oct. 22, 1987, 62-266918
Int. Cl.[4] G01D *5/34*
U.S. Cl. 250—231 SE **24 Claims**

1. A rotary encoder comprising:
a laser device for generating a laser light, the laser light being superposed with first and second laser light components of different frequencies from each other, thereby creating a beat of a first frequency on the laser light;
a rotational member having a rotational axis for rotating thereabout at a rotating speed in which a rotational angle of said rotational member per a unitary period of time varies depending upon elapsing of time, said rotational member having a light scattering plane;
a first detecting means for detecting the first frequency of the beat;
a splitting/irradiating means for splitting the laser beam into the first and second laser light components and irradiating the first laser light onto the light scattering plane of said rotational member to scatter the first laser light component;
a synthesizing means for synthesizing the scattered first laser light component and the second laser light component and providing a synthesized laser light, said synthesizing



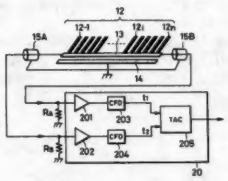
means outputting the synthesized laser light having a beat of a second frequency;
a second detecting means for detecting the second frequency of the beat; and
an arithmetic means for computing the rotational angle based on the first and second frequencies of the beats.

4,882,480

APPARATUS FOR DETECTING THE POSITION OF INCIDENCE OF PARTICLE BEAMS INCLUDING A MICROCHANNEL PLATE HAVING A STRIP CONDUCTOR WITH COMBED TEETH

Koichiro Oba, Shizuoka, Japan; Wilfried Schoeps, Koblenz, and David Taqqu, Zurich, both of Switzerland, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan

Filed Sep. 11, 1987, Ser. No. 95,262
Claims priority, application Japan, Sep. 12, 1986, 61-215400
Int. Cl.[4] H01J *31/50*, *40/14*
U.S. Cl. 250—213 VT **12 Claims**



1. An apparatus for detecting the position of incidence of a particle beam, said apparatus comprising:
a microchannel plate including an output electrode and a ground electrode, said output electrode including a strip conductor having first and second ends and a plurality of stripes extending from said strip conductor, a portion of said ground conductor being adjacent to and spaced from a portion of said strip conductor so that said ground conductor portion and said strip conductor portion form a microstrip line, the incidence of the particle beam on said output electrode generating a signal, a first portion of the signal being communicated to said first end of said strip conductor and a second portion of the signal being communicated to said second end of said strip conductor; and
an incident position detector circuit operatively coupled to said first and second ends of said strip conductor for com-

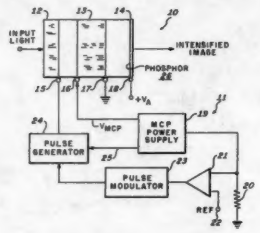
paring the arrival time of the first signal portion to the arrival time of the second signal portion to determine the position of incidence of the particle beam on said output electrode.

4,882,481

AUTOMATIC BRIGHTNESS CONTROL FOR IMAGE INTENSIFIERS

Lawrence H. Gilligan, and David W. Gerdt, both of Charlottesville, Va., assignors to Sperry Marine Inc., Charlottesville, Va.

Filed Oct. 19, 1988, Ser. No. 259,829
Int. Cl.[4] H01J *31/50*
U.S. Cl. 250—213 VT **5 Claims**



1. Brightness control apparatus for an image intensifier having a photocathode, a microchannel plate, and an anode, comprising:

monitoring means for monitoring the current drawn by said microchannel plate in response to the light level impinging on said photocathode and for providing a pulse control signal in accordance therewith, and

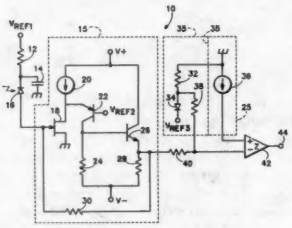
pulse generating means responsive to said pulse control signal for providing a pulse train to said photocathode so that said image intensifier is gated on and off with an on period proportional to said light level impinging on said photocathode.

4,882,482

THERMALLY STABILIZED OPTICAL PREAMPLIFIER

Kevin K. Smith, West Linn, Oreg.; Bryan E. Allsop, Hertfordshire, and Seb Naik, Hamow, both of England, assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Oct. 26, 1988, Ser. No. 262,922
Int. Cl.[4] H01J *40/14*; H03F *3/08*
U.S. Cl. 250—214 A **5 Claims**



1. A thermally stabilized optical preamplifier comprising:

(a) means for producing a photosignal current in response to an external light source;

(b) a first transimpedance amplifier including an input GaAs device coupled to the producing means, the first transimpedance amplifier having a voltage output, the voltage output being the sum of the bias voltage of the GaAs device and a voltage proportional to the photosignal current;

(c) means for converting the voltage output of the first transimpedance amplifier to a signal current;

(d) a second transimpedance amplifier having a voltage output and a current summing input for receiving the signal current; and

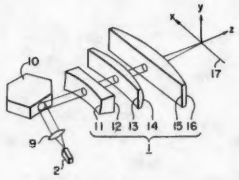
(e) means for providing a compensation current to the current summing input of the second transimpedance amplifier, the compensation current substantially cancelling the portion of the signal current produced by the bias voltage of the GaAs device.

4,882,483

OPTICAL SCANNING APPARATUS WITH OPTICAL CORRECTION FOR SCAN MIRROR SURFACE TILT

Takeshi Mochizuki, Mito; Akira Arimoto, Kodaira, and Susumu Saito, Hachioji, all of Japan, assignors to Hitachi, Ltd. and Hitachi Koki Co., Ltd., both of Tokyo, Japan

Filed Apr. 8, 1988, Ser. No. 179,407
Claims priority, application Japan, Apr. 10, 1987, 62-86886
Int. Cl.[4] H01J *3/14*
U.S. Cl. 250—236 **4 Claims**



1. An optical scanning apparatus having a rotary polygonal mirror for scanning and deflecting a flux of light from a light source, and a scanning lens having a function to compensate for and to decrease a nonuniformity in scanning spaces due to a surface tilt of said rotary polygonal mirror, said scanning lens focusing the flux of light at a position on a scanning plane in proportion to a deflection angle of the deflected light flux, comprising the improvement wherein said scanning lens is composed of three lens elements, and a refractive power, in a direction effecting the correction of the surface tilt, that is, an inverted number of a focal length, of a lens element located centrally in said scanning lens is changed in accordance with a scanning view angle.

4,882,484

METHOD OF MASS ANALYZING A SAMPLE BY USE OF A QUISTOR

Jochen Franzen; Reemt-Holger Gabling, both of Bremen; Gerhard Heinen, Grasberg, and Gerhard Weiss, Weyhe, all of Fed. Rep. of Germany, assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 31, 1988, Ser. No. 265,108
Int. Cl.[4] H01J *49/42*
U.S. Cl. 250—282 **10 Claims**

1. The method of mass analyzing a sample which comprises the steps of:

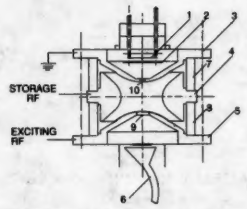
defining a three-dimensional electrical quadrupole storage field in which sample ions over the entire mass range of interest can be simultaneously trapped;

introducing or creating sample ions into the quadrupole field whereby ions within the mass range of interest are simultaneously trapped and perform ion-mass specific secular movements;

superimposing an exciting RF field with a frequency different from that of the storage RF field;

changing the superimposed fields so that simultaneously and

stably trapped ions of consecutive masses encounter a resonance of their secular movements with the exciting RF field, take up energy, increase thereby the secular movement amplitudes, and leave the trapping field;



detecting the ions of sequential masses as they leave the trapping field; and

providing an output signal indicative of the ion mass.

4,882,485

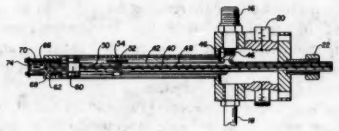
ION DETECTOR AND ASSOCIATED REMOVABLE IONIZER INLET ASSEMBLY

Anthony N. Duryea, Cheswick, Pa., assignor to Tracor, Inc., Austin, Tex.

Continuation of Ser. No. 83,376, Aug. 10, 1987, which is a continuation of Ser. No. 898,839, Aug. 20, 1986, abandoned, which is a continuation of Ser. No. 676,068, Nov. 29, 1984. This application Oct. 7, 1988, Ser. No. 255,137

Int. Cl.[4] H01J *49/04*

U.S. Cl. 250—288 **29 Claims**



1. An ion detector comprising an ionizer inlet assembly, a high vacuum chamber partially receiving said ionizer inlet assembly, an analyzer assembly disposed within said high vacuum chamber and adapted to receive ions from said ionizer,

detector means for receiving ions from said ionizer, and

said ionizer inlet assembly having an inner tube and an outer tube spaced radially outwardly from said inner tube,

said inner tube having a gap for discharge of a portion of the material transported therein, and said outer tube having a gap for discharge of the material discharged from said inner tube through said inner tube gap,

means for adjusting the gap in said inner tube while said ion detector is operating to regulate the volume of material discharged therefrom whereby a portion of the said material will be discharged without entering said analyzer and the performance of said ionizer can be optimized, and

valve means associated with said ionizer inlet assembly, whereby said ionizer inlet assembly may be removed from said high vacuum chamber without meaningful loss of of vacuum therein.

4,882,486

ELECTRON DETECTION WITH ENERGY DISCRIMINATION

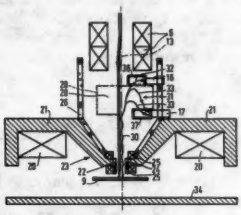
Pieter Kruit, Delft, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 85,997, Aug. 14, 1987, abandoned. This application Apr. 21, 1989, Ser. No. 342,704

Claims priority, application Netherlands, Aug. 27, 1986, 8602177

Int. Cl.[4] H01J *37/05*

U.S. Cl. 250—305 **29 Claims**



1. An apparatus for detecting electrons originating from a surface of an object being examined comprising

a measuring space having means for holding the object,

first means for directing an electron beam along an optical axis onto a surface of said object,

electron-optical system means for generating a combined electrostatic and magnetic field in said measuring space, said combined field providing a spatially dispersive effect in an energy range for electrons of a return electron beam originating from said surface, and

energy sensitive detection system means having two separated detectors for selectively detecting an entire spectrum of said electrons of said return beam within said energy range wherein each of said detectors detects a separate range of energies of said spectrum.

4,882,487

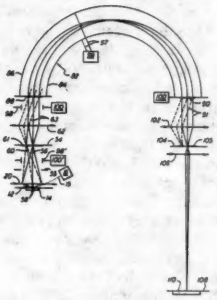
DIRECT IMAGING MONOCHROMATIC ELECTRON MICROSCOPE

Robert L. Gerlach, Minnetonka, Minn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Continuation-in-part of Ser. No. 58,437, Jun. 5, 1987, Pat. No. 4,810,880. This application Nov. 8, 1988, Ser. No. 268,440

Int. Cl.[4] H01J *37/285*

U.S. Cl. 250—306 **9 Claims**



1. A direct imaging, monochromatic electron microscope comprising emitting means for emitting electrons from a plurality of spots on a sample surface, objective lens means for

collecting a substantial portion of the emitted electrons and focusing the same at an image plane, collimating lens means for collimating the substantial portion of the emitted electrons into beams, an energy filter having an entrance aperture receptive of the beams to transit monochromatic beams having a selected energy, imaging means receptive of the monochromatic beams for focusing the same to effect an image of the spots, and detector means for detecting the image, the objective lens means having a first effective position plane, the collimating lens means having a second effective position plane and a focal length relative to the second plane, the second plane being positioned at a first distance from the image plane equal to the focal length and at a second distance from the first plane, and the entrance aperture being positioned from the second plane by approximately a third distance optically conjugate to the second distance with respect to the second plane of the collimating lens means.

4,882,488

RADIATION IMAGE READ-OUT AND REPRODUCING METHOD

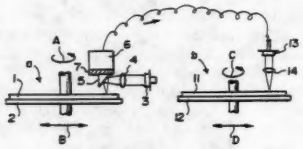
Masakazu Hashiue, Tokyo, Japan, assignor to Fuji Photo Film Co., Kanagawa, Japan

Filed Sep. 30, 1988, Ser. No. 251,481

Claims priority, application Japan, Sep. 30, 1987, 62-247316; Sep. 30, 1987, 62-247317; Oct. 19, 1987, 62-263226; Oct. 19, 1987, 62-263227

Int. Cl.[4] G01T *1/20*

U.S. Cl. 250—327.2 **32 Claims**



1. A radiation image read-out and reproducing method characterized by steps of

mounting at least one stimulable phosphor sheet carrying a radiation image stored thereon and at least one recording medium for reproducing a radiation image as a visible image respectively on first and second rotary plates,

projecting a stimulating light beam onto the stimulable phosphor sheet while the first rotary plate is rotated, thereby effecting main scanning of the sheet by the stimulating light beam and the stimulating light beam is moved relative to the first rotary plate in a radial direction of the first rotary plate, thereby effecting sub-scanning of the sheet by the stimulating light beam,

photoelectrically detecting light emitted by the stimulable phosphor sheet upon stimulation by the stimulating light beam by a photoelectric converter means, thereby obtaining an electric image signal representing the radiation image stored on the stimulable phosphor sheet,

projecting a recording light beam modulated on the basis of the electric image signal onto the recording medium while the second rotary plate is rotated in synchronization with the main scanning of the recording medium by the stimulating light beam, thereby effecting main scanning of the recording medium by the recording light beam, moving the recording light beam relative to the second rotary plate in a radial direction of the second rotary in synchronization with the sub-scanning of the stimulable phosphor sheet by the stimulating light beam, thereby effecting sub-scanning of the recording medium by the recording light beam, and

thus recording the radiation image on the recording medium simultaneously with read-out of the radiation image stored on the stimulable phosphor sheet.

4,882,489

RADIATION IMAGE RECORDING AND READ-OUT APPARATUS

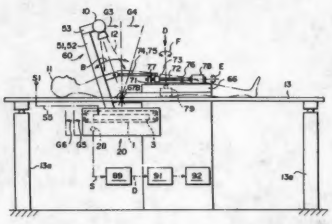
Shigeru Saotome, and Masamitsu Ishida, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 20, 1988, Ser. No. 183,806

Claims priority, application Japan, Apr. 20, 1987, 62-96715

Int. Cl.[4] G03B *42/02*

U.S. Cl. 250—327.2 **5 Claims**



1. A radiation image recording and read-out apparatus which comprises:

(i) a radiation source for irradiating a radiation toward an object,

(ii) a recording and read-out unit provided with:

(a) a case for housing therein a stimulable phosphor sheet and having longitudinal and transverse dimensions approximately equal to the longitudinal and transverse dimensions of a single image recording area on said stimulable phosphor sheet,

(b) an image recording section for holding said stimulable phosphor sheet in said case at an image recording position exposed to the radiation passing through said object, and having a radiation image of said object stored on said stimulable phosphor sheet,

(c) an image read-out section provided in said case for exposing said stimulable phosphor sheet carrying said radiation image stored thereon to stimulating rays which cause said stimulable phosphor sheet to emit light in proportion to the stored radiation energy, and photoelectrically detecting the emitted light to obtain image signals, and

(d) an erasing section provided in said case for releasing the radiation energy remaining on said stimulable phosphor sheet, for which the detection of said emitted light has been carried out, before the image recording is carried out on said stimulable phosphor sheet, and

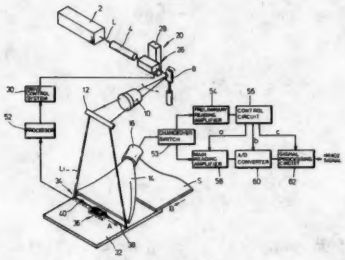
(iii) a movement means for moving said recording and read-out unit and said radiation source so that said stimulable phosphor sheet at said image recording position approximately satisfies the linear rule and the geometric rule with respect to said radiation source around an arbitrary tomographic layer.

4,882,490

LIGHT BEAM SCANNING APPARATUS HAVING TWO DETECTORS WHOSE SIGNAL RATIO INDICATES MAIN SCANNING POSITION

Yoshimi Takasaki; Akira Yamaguchi, and Ryoichi Yoshimura, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 22, 1988, Ser. No. 249,062
Claims priority, application Japan, Sep. 22, 1987, 62-239783; Oct. 1, 1987, 62-248512
Int. Cl.[4] H01J *3/14, 5/16, 40/14*
U.S. Cl. 250—236 9 Claims



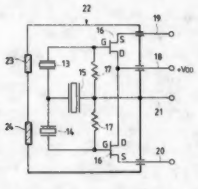
1. A light beam scanning apparatus for scanning an object by applying a light beam deflected in a main scanning direction to the object while moving said object in an auxiliary scanning direction substantially normal to said main scanning direction, said light beam scanning apparatus comprising first and second light detecting means juxtaposed in said main scanning direction and having respective light detecting surfaces extending in said auxiliary scanning direction such that said first and second light detecting means produce respective output signals at a predetermined ratio when the light beam for scanning he object in the main scanning direction is in a reference main scanning position, and produce respective output signals at a ratio varied from said predetermined ratio when the light beam is deviated from said reference main scanning position, whereby the main scanning position of the light beam with respect to said object can be detected from the ratio of the output signals of said first and second light detecting means.

4,882,491

INFRARED DETECTOR

Yukitoshi Tamura, Sakura, and Keiji Takamatsu, Ichikawa, both of Japan, assignors to Sumitomo Metal Mining Co., Ltd., Tokyo, Japan

Filed Oct. 27, 1988, Ser. No. 263,622
Claims priority, application Japan, Oct. 29, 1987, 62-274383
Int. Cl.[4] G01J *5/10*
U.S. Cl. 250—338.3 10 Claims



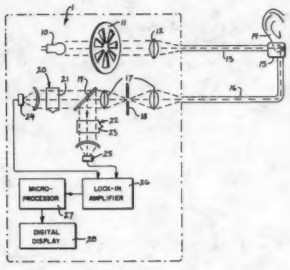
1. An infrared detector comprising two light receiving elements connected in series in such directions as to oppose the orientations of polarization thereof to each other; a compensating element arranged in such a direction as to oppose the orientation of polarization thereof to those of said two light receiving elements respectively, and has sensitivities to outputs produced by vibration and temperature variation substantially equivalent to the sums of the sensitivities of said light receiving elements to outputs produced by vibration and temperature variation respectively; two windows of incidence arranged in correspondence to said two light receiving elements respectively for allowing rays to be incident on said two windows of incidence; and a light interrupting wall arranged between said two windows of incidence to prevent rays emitted from a single object from being incident simultaneously on said two light receiving elements, said compensating element being arranged at such a position as not to be irradiated with the incident light.

4,882,492

NON-INVASIVE NEAR INFRARED MEASUREMENT OF BLOOD ANALYTE CONCENTRATIONS

Kenneth J. Schlager, Elm Grove, Wis., assignor to Biotronics Associates, Inc., Wauwatosa, Wis.

Filed Jan. 19, 1988, Ser. No. 145,459
Int. Cl.[4] G01N *33/50, 21/59, 21/47*
U.S. Cl. 250—346 21 Claims



1. A method for the non-invasive measurement of the concentration of a blood analyte comprising the steps of:

(a) directing a beam of near infrared light to a source containing the blood analyte to be measured;

(b) causing the beam to be transmitted or reflected by the source so as to provide a spectrally-modified beam;

(c) directing the modified beam into two paths;

(d) directing the modified beam of one path through a first optical filter having an absorption spectra of the analyte sufficient to block light for the maximum expected concentration of the analyte;

(e) directing the modified beam of the other path through a second optical filter having an absorption spectra sufficient to block light equally at all wavelengths;

(f) measuring the relative intensity of the beam from each path exiting its respective optical filter;

(g) generating a signal representative of the difference in intensity between the beams; and,

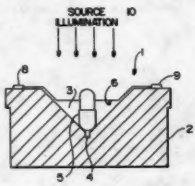
(h) converting the signal into an indication of analyte concentration.

4,882,493

SAMPLE HOLDERS OR REFLECTORS FOR INTACT CAPSULES AND TABLETS AND FOR LIQUID MICROCELLS FOR USE IN NEAR-INFRARED REFLECTANCE SPECTROPHOTOMETERS

Robert A. Lodder, Bloomington, Ind., assignor to Indiana University Foundation, Bloomington, Ind.

Filed Mar. 9, 1988, Ser. No. 165,751
Int. Cl.[4] G01N *21/84, 21/01*
U.S. Cl. 250—353 8 Claims



1. A sample holder for use in an infrared spectrophotometer comprising:

(a) a main body comprising a metal disc with a substantially 90° right-circular cone-shaped receptacle therein, said cone-shaped receptacle having a second smaller receptacle therein, located at the vertex of said cone-shaped receptacle:

(b) an insert, which may be inserted into said cone-shaped receptacle, comprising a cylindrical portion, which may be inserted into said second receptacle, and a substantially 90° right-circular insert cone portion oriented in an opposing direction to the cone-shaped receptacle of said main body:

(c) a wire, attached to said main body, which is suspended above and across said cone-shaped receptacle, said wire forming a loop directly above said insert cone portion for suspending a sample.

4,882,494

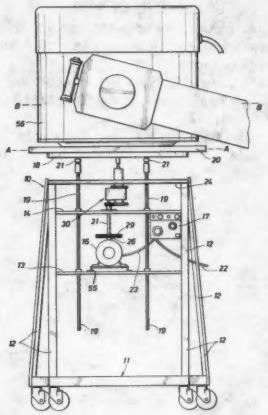
APPARATUS AND METHOD FOR FLOODING A NUCLEAR IMAGING DEVICE WITH RADIATION FROM AN IMAGING SOURCE

Roxanne R. Rogers, Houston, Tex.; Steven B. Kirby, Miami, Fla.; Theodore Simon, Dallas, and Sharon Matthiesen, Arlington, both of Tex., assignors to Michael D. Duncan, Dallas, Tex.

Filed Feb. 26, 1988, Ser. No. 160,839
Int. Cl.[4] G01T *1/164*
U.S. Cl. 250—363.09 16 Claims

1. A method for flooding a nuclear imaging device with radiation from a radiation emitting calibration source, the device having a plurality of radiation sensors, the source having multiple radiation-emitting areas, the method comprising the steps of

positioning the source adjacent the device for reception of radiation from the source by the device's sensors, and



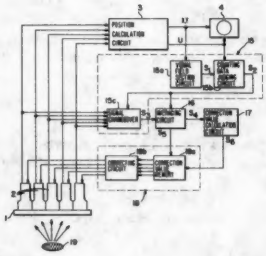
moving the source in a controlled motion so that individual sensors receive radiation from more than one radiation-emitting area of the source.

4,882,495

SCINTILLATION CAMERA

Masatoshi Tanaka, Chiba, Japan, assignor to Hitachi Medical Corporation, Tokyo, Japan

Continuation of Ser. No. 817,614, Jan. 10, 1986, abandoned. This application Apr. 26, 1988, Ser. No. 188,173
Claims priority, application Japan, Jan. 12, 1985, 60-2634
Int. Cl.[4] G01T *1/208*
U.S. Cl. 250—363.09 6 Claims



1. In a scintillation camera for obtaining a distribution image of incident radioactive rays from a subject, having a scintillator for emitting flashes of light due to incident radioactive rays, a plurality of photomultiplier tubes where each is optically coupled with said scintillator for converting the light flashes into respective electric signals and a position calculating circuit for calculating an incident position of the radioactive rays on the scintillator in response to the output signals of each photomultiplier tube to produce a position signal indicative of an incident position of the radioactive rays on the scintillator and a display signal to a display unit, the improvement comprising:

a photomultiplier tube changeover circuit for determining in response to the position signal from said position calculating circuit which one of said photomultiplier tubes has just been irradiated with radiation rays and for outputting

output signals only from said selected one photomultiplier tube;

an averaging circuit for taking an arithmetical average of output signals from said photomultiplier tube changeover circuit with respect to a predetermined number of said output signals so as to average the magnitude of the output signals of each photomultiplier tube, said average being successfully and parallely calculated for respective output signals from said photomultiplier tube changeover circuit during detection of the incident radioactive rays from the subject;

a correction value calculating circuit for detecting a variation in the sensitivity of said photomultiplier tube by comparing the averaged magnitude of the output signals from said averaging circuit with a reference value determined by the energy of the incident radioactive rays so as to calculate a correction value for said each photomultiplier tube; and

a photomultiplier tube correcting circuit for controlling a voltage applied to said each photomultiplier tube so as to automatically adjust the sensitivity of each of said photomultiplier tubes.

4,882,496

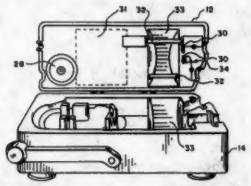
APPARATUS FOR EXCHANGING AND IRRADIATING TUBING CONNECTIONS

Marc Bellotti, Libertyville; Arthur Lueders, Mundelein; Daniel B. Granzow, Ingleside; Larry C. Taylor, and Mark Nauman, both of McHenry, all of Ill., assignors to Baxter International Inc., Deerfield, Ill.

Filed Apr. 29, 1988, Ser. No. 188,012

Int. Cl.[4] A61L *2/10*

U.S. Cl. 250—455.1 **5 Claims**



1. In an improved electromechanical apparatus for breaking, forming and irradiating tubing connections for fluid flow for antimicrobial effect therein, the improvement comprising, in combination;

a housing having top and bottom portions removably attached to one another; u.v. irradiation means; and

electromechanical means in said housing for effecting said exchange and irradiation of said tubing connectors, said electromechanical means including means for forcing compliance with a predetermined sequence of steps to effect said exchange and irradiation by user of said apparatus.

4,882,497

METHOD AND APPARATUS OF MEASURING OUTER DIAMETER AND STRUCTURE OF OPTICAL FIBER

Akira Inoue, and Yasuji Hattori, both of Kanagawa, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Aug. 14, 1987, Ser. No. 85,598

Claims priority, application Japan, Aug. 15, 1986, 61-191534; Jan. 28, 1987, 62-17506; Mar. 3, 1987, 62-48519; May 12, 1987, 62-115333; May 14, 1987, 62-117488

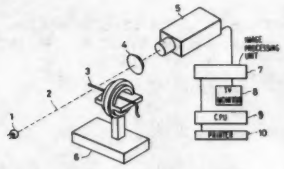
Int. Cl.[4] G01N *21/86*

U.S. Cl. 250—560 **16 Claims**

1. An apparatus for examining the structure of an optical fiber having a core and a cladding surrounding said core, said core and said cladding having different refractive indices, said apparatus comprising:

optical measuring means comprising a light source for irradiating a side wall of said optical fiber with an observing light beam and a pickup system for detecting that part of said observing light beam which traverses said optical fiber;

means for mounting said optical fiber, one of said optical



fiber mounting means and said optical measuring means being rotatable relatively to the other such that an axis of said optical fiber and the optical axis of said optical measuring means are set perpendicular to each other; and

means coupled to said pickup system for correcting a luminance distribution as detected by said pickup system for a lens effect due to the different refractive indices of said core and said cladding of the optical fiber under observation.

4,882,498

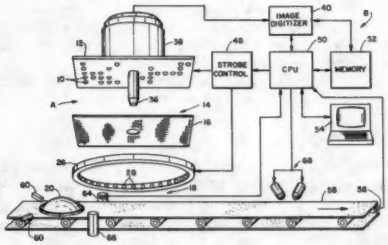
PULSED-ARRAY VIDEO INSPECTION LIGHTING SYSTEM

Don W. Cochran, Highland Heights, and James R. Austin, Mentor-on-the-Lake, both of Ohio, assignors to Pressco, Inc., Cleveland, Ohio

Continuation of Ser. No. 107,265, Oct. 9, 1987, abandoned. This application Apr. 7, 1989, Ser. No. 336,642

Int. Cl.[4] G01N *21/86, 9/04*

U.S. Cl. 250—571 **22 Claims**



1. An engineered inspection lighting system comprising:

a plurality of directed primary light generating elements directed to a primary light field;

means for securing the primary light generating elements in a preselected array arrangement to form a primary lighting array;

means adapted for directing light from the primary light generating elements to the primary light field;

supply means for providing a single current pulse to selected light generating elements of the primary lighting array to illuminate an associated specimen within the primary light field; and

the primary light field including a plurality of sections, the primary light generating elements being positioned in the primary lighting array such that each primary light generating element thereof does not contribute light equally to

each section of the primary light field and wherein light in the light field from at least a portion of the light generating elements of the array is overlapped with light from neighboring light generating elements of the array.

4,882,499

FIBER-OPTIC DETECTOR FOR OILS AND SOLVENTS

Mauri Luukkala, Espoo; Aarre Matilainen, Helsinki, and Jarmo Viirto, Nummela, all of Finland, assignors to Soundek Oy, Finland

Filed Mar. 10, 1988, Ser. No. 166,386
Claims priority, application Finland, Mar. 10, 1987, 871042
Int. Cl.[4] G01N *15/06*
U.S. Cl. 250—577 6 Claims

1. A fiber optic detector for liquids, comprising
a fiber optic light transmitter/receiver for transmitting light and receiving light.
an optical fiber attached to said transmitter/receiver, and
a pick-up located on a free end of said fiber for sensing liquid, wherein
at least a portion of said pick-up is formed of material which, when coming into contact with liquid to be detected, absorbs the liquid by capillarity, and
said sensing pick-up is stained, at one end thereof, with a staining agent which, in dry condition, is positioned away from said fiber free end, and is arranged to migrate to said fiber free end with the contacted liquid,
whereby, when said pick-up contacts the liquid to be detected, said staining agent travels along with the liquid being absorbed, to an unstained end of said sensing pick-up at said free end of said fiber, and
an optical reflection coefficient of the pick-up material changes which is thereby observed by said detector.

4,882,500

METHOD FOR CONVERTING STANDING WAVE VIBRATIONS INTO MOTION AND STANDING WAVE MOTOR THEREFOR

Tamotsu Iijima, Kofu, Japan, assignor to Nippon Seimitsu Kogyo Kabushiki Kaisha, Kofu, Japan

Continuation of Ser. No. 58,100, Jun. 4, 1987, abandoned. This application Sep. 19, 1988, Ser. No. 245,944
Claims priority, application Japan, Jun. 4, 1986, 61-129809; Jun. 4, 1986, 61-129810; Jun. 4, 1986, 61-129811; Jun. 4, 1986, 61-129812; Jun. 4, 1986, 61-129813
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—323 27 Claims

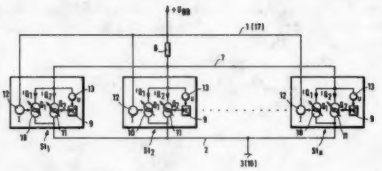
1. A standing wave motor which is driven by converting standing wave vibrations into motion, comprising an elastic vibration member; at least one vibrator disposed on said vibration member and adapted to generate a standing wave having a fixed wavelength in said vibration member by applying a periodic voltage of fixed frequency thereto, said vibration member having a length substantially equal to integral multiples of the half wavelength of the standing wave generated in said vibration member; at least one row of motion extracting means integrally formed on at least one surface of said vibration member in the shape of protrusions and located within at least one of the odd or even numbered sections of quarter wavelength sections defined by equally dividing each wavelength of the standing wave into four and at a portion substantially exclusive of a loop and a node of the standing wave, said motion extracting means each having a width less than quarter the wavelength of the standing wave generated in said vibration member in longitudinal direction relative to said vibration member; and at least one moving member being in contact with said motion extracting means on the vibration member thereby to cause relative motion of the vibration member and the moving member by transmitting amplitude motion of the standing wave generated in the vibration member to the moving member through the motion extracting means.

4,882,501

POWER SUPPLY ARRANGEMENT FOR ELECTRO-HYDRAULIC CONTROL SYSTEMS IN MINING AND CIVIL ENGINEERING

Johannes Konig, and Martin Reuter, both of Munich, Fed. Rep. of Germany, assignors to Gewerschaft Eisenhutte Westfalia GmbH, Fed. Rep. of Germany

Filed May 9, 1988, Ser. No. 191,549
Claims priority, application Fed. Rep. of Germany, May 9, 1987, 3715590
Int. Cl.[4] H02J *1/00*
U.S. Cl. 307—11 12 Claims



1. A power supply arrangement for use in an electro-hydraulic support control system for mining and civil engineering, in which a group of control units utilize control means in the form of microprocessors, microcomputers or electronic evaluators to control temporary power supply of electrical loads from a constant voltage source common to the group, the voltage source being designed for a maximum current requirement of all electrical loads supplied by it; said arrangement comprising a current measuring device for each control unit for determining the effective dynamic current consumption of the unit and the loads controlled thereby, an adjustable current source for each control unit which is adjusted by the respective device to a current value dependent on the effective current consumption and a common potential line connected to all the adjustable current sources which carries a control voltage which varies according to a total of the current consumptions, of all the units, the control voltage being usable by the control means in the control units to determine the available current which the voltage source can deliver without overloading.

4,882,502

INTEGRATED CIRCUIT FOR CONTROLLING THE LOADS OF AUTOMOBILE CIRCUITRY

Yoshinobu Kobayashi, Osaka, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

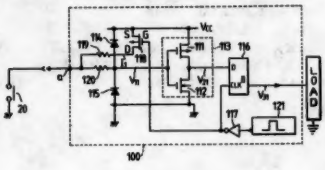
Filed Jun. 17, 1988, Ser. No. 207,792
Claims priority, application Japan, Jun. 17, 1987, 62-149273
Int. Cl.[4] H03K *17/56, 3/01;* H03L *5/00;* H03H *7/20*
U.S. Cl. 307—247.1 5 Claims

1. An integrated circuit for judging the on/off status of a control signal for switching a load, comprising:
a switch which generates said control signal for switching said load;
a regulated power supply;

latch pulse generating means for generating an input latching pulse at an output thereof;

a p-channel type MOSFET whose source electrode is connected to said regulated power supply and whose gate electrode receives said input latching pulse from said output of said latch pulse generating means;

a pull-up resistor connected between a drain electrode of said p-channel type MOSFET and one side of said switch for receiving said control signal from said switch, said



pull-up resistor only being operative when said p-channel type MOSFET is activated by said input latching pulse applied to said gate electrode; and

a register, which receives said control signal from said one side of said switch at a first input and said input latching pulse at a second input, for latching said control signal from said switch in response to said input latching pulse and for outputting said latched control signal to control switching of said load.

4,882,503

METHOD OF CORRECTING A DEAD TIME

Yoshihiro Wakiyama; Takeshi Aoyama, and Yoshiro Ohnishi, all of Kyoto, Japan, assignors to Horiba, Ltd., Kyoto, Japan

Continuation-in-part of Ser. No. 22,873, Mar. 6, 1987, abandoned. This application Sep. 19, 1988, Ser. No. 248,248

Claims priority, application Japan, Mar. 17, 1986, 61-60436

Int. Cl.[4] H03K *5/04, 5/153*

U.S. Cl. 307—267 **3 Claims**

1. A method of correcting a dead time in an analog/digital converter or a linear amplifier, wherein said dead time is obtained by the steps comprising;

determining a first time, wherein said first time represents the time elapsed from (a) a predetermined level of an output signal generated by a slow amplifier in response to an input pulse, to (b) a peak level of said output signal;

measuring a second time, wherein said second time is the time required for treating said input pulse;

adding said first time to said second time, thereby obtaining said dead time.

4,882,504

INTERRUPTER ARRANGEMENT FOR HIGH-FREQUENCY SIGNALS

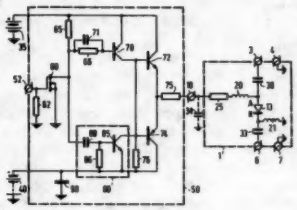
Gilbert Petitjean, Igny, and Michel Lebourg, Clamart, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 19, 1988, Ser. No. 221,153

Claims priority, application France, Jul. 24, 1987, 87 10581

Int. Cl.[4] H03K *17/74, 5/08;* **H03B** *1/04;* **H02H** *7/20*

U.S. Cl. 307—256 **4 Claims**



1. An interrupter circuit arrangement for high frequency signals, comprising:

a switching circuit having a high-frequency signal path which includes at least one diode, said switching circuit having a control terminal for receiving control signals for biasing said diode to either conductive state or non-conductive state, and a high-frequency bypass capacitance at said control terminal;

a control circuit having an output connected to said control terminal for supplying said control signals thereto in response to command voltages supplied to an input of said control circuit, said control circuit producing such a control signal from a first voltage source when a command voltage signifies that said signal path is to be rendered conductive and producing such a control signal from a second voltage source of opposite polarity from said first voltage source when a command voltage signifies that said signal path is to be rendered non-conductive; and

an overvoltage circuit comprised in said control circuit which produces a trigger pulse in response to a change-over from said first voltage source to said second voltage source, such trigger pulse causing said control circuit to produce a charging current trigger pulse at the output thereof for charging said bypass capacitance.

4,882,505

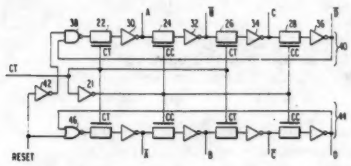
FULLY SYNCHRONOUS HALF-FREQUENCY CLOCK GENERATOR

Anatol Furman, Jericho, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 24, 1986, Ser. No. 843,348

Int. Cl.[4] H03K *5/15, 23/44*

U.S. Cl. 307—269 **7 Claims**



1. A fully synchronized clock generator comprising:

first and second synchronous counters, each comprising:

a string of at least two serially connected shifting elements, said string having a string input terminal and a string output terminal, each of said shifting elements comprising a series connection of an inverter and a transistor having two current-carrying electrodes and a control electrode;

control means having an output connected to said string input terminal, a first input terminal connected to said string output terminal, and a second input terminal connected for receiving a reset signal for placing said control means into one of two modes so that each of said first and second counters are synchronously reset with respect to one another, said control means resetting said counter in a first mode, and operating as an inverter in a second mode; and

clock means for applying voltages of a given phase to the control electrode of the transistor of the first and any subsequent odd-numbered shifting element in said string, and for applying voltages of an opposite phase to the control electrode of the transistor of the second and any subsequent even-numbered shifting element in said string;

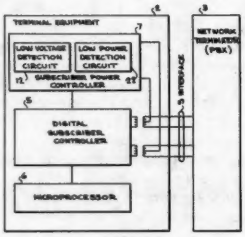
wherein said control means of said first counter and said control means of said second counter are of different constructions such that said first and second counters can be reset to, and operate in, polarities opposite to one another.

4,882,506

LOW VOLTAGE AND LOW POWER DETECTOR CIRCUITS

Jan H. Johansson, Balsta, Sweden, and Erik K. Lunderius, San Jose, Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Sep. 17, 1986, Ser. No. 908,536
Int. Cl.[4] H03K *3/01, 19/086, 19/092;* **G06G** *7/12*
U.S. Cl. 307—296.1 **15 Claims**



1. Low voltage and low power circuits for use in a subscriber power controller comprising:

low voltage detection means for generating a first output signal switching between ECL logic levels;

said low voltage detection means being formed of a first comparator means and a first output stage;

said first comparator means being formed of a first comparator with hysteresis for comparing a low voltage detection signal proportional to a primary input supply voltage with a first internal reference voltage to produce a first detected signal;

said first output stage being responsive to said first detected signal to produce said first output signal;

low power detection means for generating a second output signal switching between a high voltage level and a low voltage level;

said power detection means being formed of a second comparator means and a second output stage;

said second comparator means being formed of a second comparator with hysteresis for comparing a low power detection signal proportional to the primary input supply voltage with the second internal reference voltage to produce a second detected signal; and

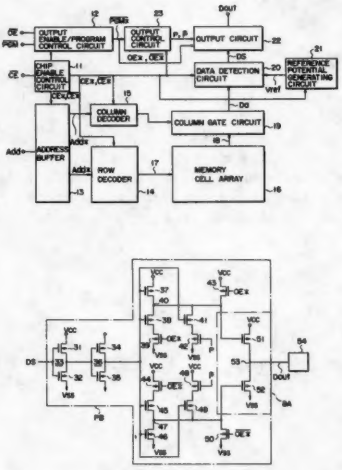
said second output stage being responsive to said second detected signal to produce said second output signal.

4,882,507

OUTPUT CIRCUIT OF SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE

Yuuichi Tatsumi, Tokyo; Hidenobu Minagawa, Kawasaki; Hiroshi Iwahashi, Yokohama; Masamichi Asano, Tokyo, and Mizuho Imai, Annaka, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 29, 1988, Ser. No. 226,307
Claims priority, application Japan, Jul. 31, 1987, 62-191602
Int. Cl.[4] H03K *3/013, 17/06, 17/16, 17/284*
U.S. Cl. 307—443 **24 Claims**



1. A semiconductor integrated circuit comprising:

an output circuit including a transistor whose conduction state is controlled according to an internal signal and charging and discharging a preset node by controlling the conduction state of said transistor, thus outputting a signal; and

control means for increasing a rate of reduction in the conduction resistance of said transistor for a preset period of time after the control signal has changed in level.

4,882,508

DUAL FLUX PATH VOICE COIL MOTOR

Khalid A. Mawla, Monte Sereno, Calif., assignor to International Business Machines, Armonk, N.Y.

Filed Mar. 14, 1988, Ser. No. 168,057
Int. Cl.[4] H02K *41/00*
U.S. Cl. 310—13 **5 Claims**

1. A linear voice coil motor actuator having a dual magnetic flux path for head positioning in a disk file comprising:

a magnetically permeable center core having a central longitudinal axis generally parallel to the linear path of the actuator and two parallel faces on opposites sides of and generally parallel to the central longitudinal axis, the center core further comprising two generally like sections;

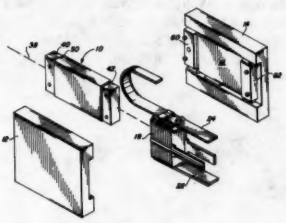
means for supporting the two center core sections in a

spaced apart relationship along the center core longitudinal axis;

a magnetically permeable outer core generally surrounding the center core and having parallel inner walls, each of said outer core inner walls being generally parallel to and spaced from a corresponding center core face;

at least one generally flat permanent magnet attached to each of said center core faces;

at least one generally flat permanent magnet attached to



each of said outer core inner walls, the magnet on each inner wall having its magnetic polarity opposing the magnetic polarity of the corresponding center core magnet and being spaced therefrom so as to define a gap;

an electrically conductive coil surrounding the center core and located within the gap; and

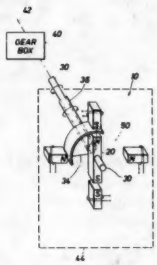
means for supporting the coil within the gap and for providing linear movement of the coil through the gap in a direction generally parallel to the longitudinal axis of the center core.

4,882,509

MOTOR INCORPORATING A SUPERCONDUCTING SHIELD

James E. Wottlin, 88 Whispering Pines, Conroe, Tex. 77302

Filed Jul. 5, 1988, Ser. No. 215,325
Int. Cl.[4] H02K *37/00*
U.S. Cl. 310—46 **16 Claims**



1. A motor which comprises:

(a) a stator formed of a plurality of magnetic poles the poles being arranged in alternate north and south poles at an instant wherein the stator positions stator poles in a circular arrangement;

(b) a rotor positioned within said and adapted to be rotated by motor action wherein said rotor is formed of alternating north and south magnetic poles;

(c) said rotor rotating as a result of attraction and repulsion between said rotor and stator poles and wherein said stator and rotor define a gap therebetween circumferentially about said rotor; and

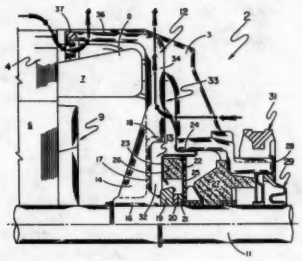
(d) a rotating shield means having a window therein, said shield means and window blanking off selected attractive and repulsive pole combinations across said gap, wherein said shield prevents selected magnetic coupling across said gap.

4,882,510

MOTOR COOLING AND PARTICULATE TRAPPING STRUCTURE

Barry M. Newberg, St. Louis County, Mo., assignor to Emerson Electric Co., St. Louis, Mo.

Filed Aug. 8, 1988, Ser. No. 229,923
Int. Cl.[4] H02K *9/00, 9/06*
U.S. Cl. 310—63 **7 Claims**



1. In an electric motor frame structure containing a stator with a stack of laminated plates having a plurality of windings extending therethrough in looped fashion to form end turns on opposed faces thereof, a rotor mounted on a rotor shaft to extend through said stator for rotation within said stator, and a lubricating system upstream thereof, an improved motor cooling structure comprising:

a separate, annular central hub member having a shaft mounting portion preselectively sized to be independently mounted on said rotor shaft adjacent one end of said stator; and,

a plurality of spaced vane members arranged to form a separate cage-like fan circumferentially and rotatably surrounding said end turns of said stator along one face of said stator, each vane member including a first section extending in fixed radial fashion from said central hub member proximally spaced in direct, uninterrupted fashion from said end turns on said face of said stator and a second section extending substantially normal from said first section proximally spaced in direct, uninterrupted fashion from the outer peripheral surfaces of said end turns so that said first and second sections provide said separate cagelike fan rotatably and circumferentially surrounding said end turns of said stator to blow in laminar fashion a cooling air stream over the face and over the outer peripheral surfaces of said end turns.

4,882,511

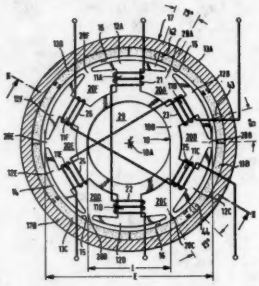
BRUSHLESS THREE-PHASE D.C. MOTOR

Johann von der Heide, Schramberg, Fed. Rep. of Germany, assignor to Papst-Motoren GmbH & Co. KG, St. Georgen, Fed. Rep. of Germany

Filed May 10, 1985, Ser. No. 733,223
Claims priority, application Switzerland, Jun. 1, 1984, 2680/84; Jan. 9, 1985, 00078/85
Int. Cl.[4] H02K *21/22, 29/08*
U.S. Cl. 310—67 R **18 Claims**

1. Collectorless three-phase D.C. motor having a permanent-magnet arrangement and a three-phase winding, these being movable relative to each other, and having three position sensors which are stationary relative to the winding and controlled by the permanent-magnet arrangement, the winding

comprise coils which are Y-connected and energized by current in a cyclical sequence in dependence upon the sensors' output signals, which latter are offset by 120°-el. one to the next, there being induced in the individual coils of the winding coil voltages, measured relative to the Y's neutral terminal, which are offset by 120°-el.; the coil voltages, in passing through zero, being alternately positive for an interval of at most 180°-el. and negative for an interval of at most 180°-el.



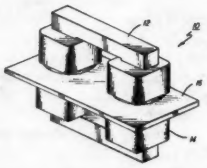
and their sum being equal to zero for every relative position as between the magnet arrangement and the winding, the improvement wherein the position sensors are so arranged relative to the winding's coils that the sensors' changes-of-state substantially coincide with the zero-crossovers of the associated coil voltages, and the winding's coils are energized via winding driver stages by means of driver voltages that directly correspond to the sensor output signals.

4,882,512

ELECTROMAGNETIC FORCE SENSOR

James H. Andrus, Glendale, Ariz., assignor to Honeywell, Inc., Minneapolis, Minn.

Filed Sep. 19, 1988, Ser. No. 246,129
Int. Cl.[4] H02K *7/09*
U.S. Cl. 310—90.5 **5 Claims**



1. A flux sensor for use in a flux field for sensing flux density comprising:

a first amplifier having a first input terminal for receiving a reference voltage and having a first output terminal;

a first Hall generator unit having a first input terminal connected to the first output terminal of the first amplifier for receiving a reference-voltage controlled current and having a first output terminal;

a second amplifier having a first input terminal connected to the first output terminal of the first Hall generator unit and having a first output terminal for supplying an output voltage;

a third amplifier having a first input terminal connected to the first output terminal of the second amplifier and having a first ouput terminal;

a second Hall generator unit having a first input terminal connected to the first output terminal of the third amplifier for receiving a flux-modulated current and having a first output terminal;

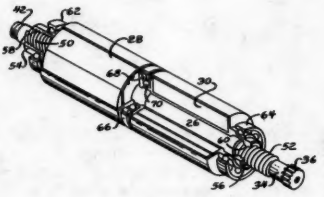
a fourth amlifier having a first input terminal connected to the first output terminal of the second Hall generator unit and having a first output terminal for supplying an output voltage.

4,882,513

DUAL PERMANENT MAGNET GENERATOR

Wayne A. Flygare; Raymond N. Olson; Richard W. Reynolds, all of Rockford, and Mohd A. Aleem, Roscoe, all of Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 23, 1985, Ser. No. 812,840
Int. Cl.[4] H02K *1/28, 7/116*
U.S. Cl. 310—114 **4 Claims**



1. A permanent magnet generator comprising:

an elongated shaft having opposed ends;

first and second helical splines on said shaft adjacent respective ends thereof, said splines having opposite pitches;

first and second permanent magnet assemblies located about said shaft and rotatable with respect thereto;

a thrust and journal bearing for said permanent magnet assmblies;

said first magnet assembly being to one side of said bearing and connected to said first spline;

said second magnet assembly being on the other side of said bearing and connected to said second spline;

a stator including an armature means coaxial with said shaft and having an axial extent encompassing said magnet assemblies, said armature means mounting said bearing intermediate the ends of said armature means; and

means for axially moving said shaft relative to said bearing and said magnet assemblies to cause said magnet assemblies to simultaneously rotate in opposite directions on said shaft.

4,882,514

SUBMERSIBLE SODIUM PUMP

Glen V. Brynsvold, San Jose; John T. Lopez, Santa Clara; Eugene E. Olich, Aptos, and Calvin W. West, Livermore, all of Calif., assignors to General Electric Company, San Jose, Calif.

Filed Jun. 7, 1988, Ser. No. 203,179
Int. Cl.[4] H02K *44/06;* **H01F** *27/28*
U.S. Cl. 310—208 **7 Claims**

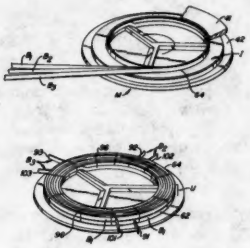
1. A pump construction for liquid sodium including a plurality of circular and discrete coil elements for being placed around a central and cylindrical central duct, a plurality of ring laminate constructions for placement to said central cylindrical duct, said plurality of ring laminate constructions for trapping and firmly engaging therebetween said coil elements, said laminate constructions comprising:

a plurality of groups of laminates arrayed side-by-side, each laminate for extending in a plane parallel to the axis of said cylindrical duct, said laminates formed from a material for conducting a magnetic field;

each group of laminates abutted to the central duct to form an arch about a segment of said central duct;

said plurality of groups of laminates each having at least one laminate parallel to a radius of said central cylindrical duct and being abutted to said central cylindrical duct to form an endless arch adjacent said central cylindrical duct completely surrounding said duct;

said groups of laminates each defining coil element receiving grooves for receiving and firmly clamping therebetween said coil elements of said pump;



means for binding said laminates radially to and towards said central duct to maintain said group of laminates as an endless arch whereby said laminate construction can be manipulated as a unitary construction with respect to said central duct; and

means for compressing said ring laminates construction together along the length of said duct for trapping said coil elements therebetween.

4,882,515

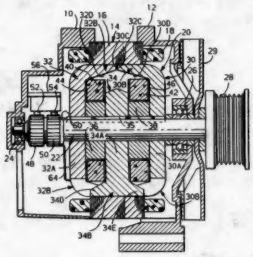
ALTERNATING CURRENT GENERATOR

Thomas A. Radomski, Utica, Mich., assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 201,717, Jun. 3, 1988, abandoned. This application Oct. 28, 1988, Ser. No. 263,850

Int. Cl.[4] H02K *19/22*

U.S. Cl. 310—263 **4 Claims**



1. A voltage regulated alternating current generator comprising, frame means, a stator supported by said frame means comprising a stator core formed of magnetic material that has slots, an output winding carried by said stator core including conductors disposed within said slots, a rotor supported for rotation by said frame means disposed within said stator core, said rotor comprising a shaft, first and second claw pole members formed of magnetic material carried by said shaft, each pole member having a plurality of circumferentially spaced and axially extending pole fingers, the number of fingers of said first pole member being equal to the number of fingers of said second pole member, said first and second pole members being so oriented on said shaft that the pole fingers of said first and second pole members are aligned with each other, said first and second pole fingers being connected in such a manner that they magnetically connect said first and second pole members through the magnetic material of said first and second pole fingers, the outer periphery of the pole fingers of said first and second pole members being aligned with portions of the inner surface of said stator core, a third pole member means formed of magnetic material carried by said shaft having circumferentially spaced pole projections, said third pole means having disk portion means disposed between said first and second pole members, the projections of said third pole member means being disposed between the fingers of said first and second pole members, a field coil located between said first pole member and said third pole member means, a permanent magnet having opposed end faces of opposite magnetic polarity located between said third pole member means and said second pole member, said field coil being so wound and electrically connected and the end faces of said permanent magnet being so magnetically poled that when said field coil is energized with direct current the pole fingers of said first and second pole members have the same magnetic polarity and the pole projections of said third pole member means has an opposite magnetic polarity whereby the fluxes developed respectively by said field coil and permanent magnet that traverses said stator core is additive, means including said disk portion means and said connected first and second pole fingers defining a closed magnetic circuit formed entirely of magnetic material that magnetically connects said opposed end faces of said permanent magnet, said magnetic circuit shunting the air gap between said rotor and stator core whereby the flux developed by said permanent magnet is diverted from said air gap by said magnetic circuit and only leakage flux developed by said permanent magnet traverses said stator core when said field coil is not energized, the magneto-motive-force developed by said field coil when energized causing the flux developed by said permanent magnet that is diverted through said magnetic circuit to be reduced whereby flux developed by said permanent magnet that traverses the air gap between said rotor and stator increases, and voltage regulating means for maintaining the output voltage of said generator at a desired regulated value, said regulating means applying direct field current to said field winding in only one direction through said field winding, said regulating means including means for varying the magnitude of said direct field current as an inverse function of the output voltage of said generator, the amount of flux developed by said permanent magnet that is diverted through said magnetic circuit decreasing as said field current increases and increasing as said field current decreases.

4,882,516

CATHODE RAY TUBE WITH INTERNAL DOUBLE-WALL MAGNETIC SHIELD

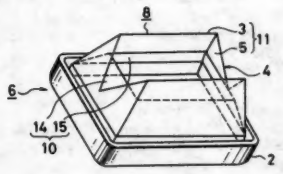
Tatsushiro Hirata, and Tomohisa Uba, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 24, 1987, Ser. No. 137,740

Claims priority, application Japan, Dec. 26, 1986, 61-316155

Int. Cl.[4] H01J *29/06*

U.S. Cl. 313—407 **4 Claims**



1. In a cathode ray tube having a face panel and an internal magnetic shield positioned adjacent said face panel, wherein

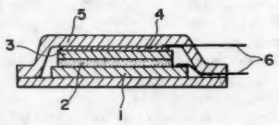
the improvement comprises said magnetic shield having an inner shield portion of inner magnetic plates and an outer shield portion of outer magnetic plates, the outer magnetic plates of said outer shield portion being longer than the inner magnetic plates of the inner shield portion and intersecting the inner magnetic plates at an angle in a range of 5° to 30°, each of said inner and outer magnetic plates having an upper edge and said magnetic shield having the following relationship: $\frac{1}{3} \leqq Ha/Hb \leqq 4/5$, wherein Ha is the distance from the upper edge of said inner magnetic plate from said panel, and Hb is the distance from the upper edge of said outer magnetic plate from said panel, both distances being measured parallel to a vertical axis of said tube.

4,882,517

ELECTROLUMINESCENT COMPOSITION CONTAINING ORGANOPOLYSILOXANE AND ELECTROLUMINESCENT DEVICE USABLE AS A BACK-LIGHTING UNIT FOR LIQUID CRYSTAL DISPLAY

Kazumasa Maruyama; Tatsushi Kaneko, and Tohru Chiba, all of Niigata, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Feb. 7, 1989, Ser. No. 306,962
Claims priority, application Japan, Feb. 9, 1988, 63-28046
Int. Cl.[4] B32B *9/00;* **G02F** *1/13;* **H01J** *1/63;* **G09G** *3/10*
U.S. Cl. 313—502 **10 Claims**



7. An electroluminescent device which comprises:

(A) a layer of an electroluminescent composition comprising

(a) a dielectric material as a matrix mainly composed of a cyanoalkyl group-containing organopolysiloxane represented by the average unit formula

$$R^1_aR^2_bSiO_{(4-a-b)/2}$$

in which R^1 is a cyanoalkyl group having 3 to 5 carbon atoms, R^2 is a hydrogen atom or a monovalent hydrocarbon group, the subscript a is a positive number in the range from 0.8 to 1.8 and the subscript b is zero or a positive number not exceeding 1.0 with the proviso that a+b is in the range from 1.1 to 1.98, and

(b) a particulate electroluminescent material dispersed in the matrix; and

(B) two electrode plates sandwiching the layer of the electroluminescent composition.

4,882,518

BACK CAP FOR AN ELECTROLUMINESCENT DISPLAY

Walter L. Cherry, Waukegan, Ill., assignor to The Cherry Corporation, Waukegan, Ill.

Filed May 25, 1988, Ser. No. 198,233
Int. Cl.[4] H05B *33/04*
U.S. Cl. 313—512 **39 Claims**

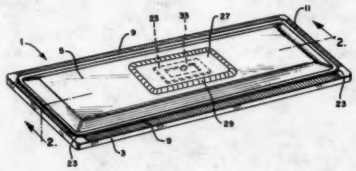
1. A display panel, comprising:

electroluminescent phosphor means for emitting light in response to electrical energization signals;

transparent substrate means for supporting said phosphor means and transmitting said emitted light;

back cap means for enclosing said phosphor means, said back cap means being made of a compliant substantially gas impermeable material for flexing without rupturing;

means for hermetically sealing said back cap means against said substrate means; and



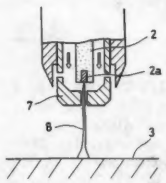
means for maintaining said back cap means in a flexed relation to said substrate means, so that varying ambient air pressure is equally applied to the back cap means and the substrate means without affecting the hermetic seal.

4,882,519

DISCHARGE ELECTRODE MATERIAL COMPOSED OF YTTRIUM AND RHENIUM OR RUTHENIUM

Yoshinori Maeno; Hiroshi Mikita; Sadao Umezu, all of Neyagawa; Fukuhisa Matsuda, Kawanishi, and Masao Ushio, Toyonaka, all of Japan, assignors to Toho Kinzoku Co., Ltd., Osaka, Japan

Filed Mar. 30, 1988, Ser. No. 175,431
Int. Cl.[4] H01J *1/14*
U.S. Cl. 313—633 **3 Claims**



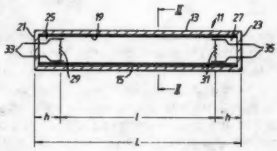
1. A discharge electrode material excellent in heat resistance and oxidation resistance consisting essentially of yttrium oxide, and rhenium or ruthenium.

4,882,520

RARE GAS ARC LAMP HAVING HOT CATHODE

Shinichi Tsunekawa, Fujisawa, and Masami Takagi, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 31, 1988, Ser. No. 176,147
Claims priority, application Japan, Apr. 2, 1987, 62-79719
Int. Cl.[4] H01J *17/20, 61/16*
U.S. Cl. 313—643 **12 Claims**



1. A rare-gas arc lamp which produces a positive column for radiating light in a predetermined luminance distribution, said rare-gas arc lamp comprising:

a tube having an axis;

a fluorescent layer formed on the inner surface of said tube;

a rare-gas mainly including xenon gas and having substantially no mercury sealed within said tube, said rare-gas being sealed within said tube at a pressure in the range of 20 Torr to 200 Torr;

a first electrode located at a first position within said tube;

a second electrode, constituted by a hot cathode, at a second position within said tube; and

means for providing a potential difference between the first and second electrodes so as to establish a positive column therebetween, said positive column having an area perpendicular to said axis, said area being larger than a corresponding area of an arc discharge lamp not using a hot cathode for controlling luminance distribution.

4,882,521

DEFLECTION YOKE FOR A COLOR CATHODE RAY TUBE

Nozomu Arimoto, Takatsuki, Japan, assignor to Matsushita Electronics Corporation, Kadoma, Japan

Filed May 18, 1988, Ser. No. 195,245

Claims priority, application Japan, May 19, 1987, 62-121956

Int. Cl.[4] H01J *29/70*

U.S. Cl. 313—440 **18 Claims**

1. A deflection yoke for a color cathode ray tube comprising:

a pair of horizontal deflection coils;

a pair of vertical deflection coils;

an insulative bobbin for supporting said deflection coils, said bobbin having a flared end;

magnetic field correction means disposed at the flared end of the insulative bobbin, having ferro-magnetic cores of a long and slender shape and disposed along the end portion of either of said horizontal deflection coils or said vertical deflection coils; and

a pair of auxiliary coils which are wound at both end portions of said core and are connected to said horizontal or vertical deflection coils, respectively.

4,882,522

NEON CIRCUIT MALFUNCTION DETECTOR

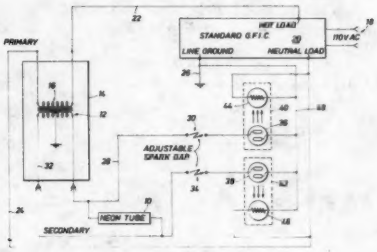
Roger A. Brown, League City, Tex., assignor to Irin Paris, Houston, Tex., a part interest

Filed Mar. 25, 1988, Ser. No. 173,303

Int. Cl.[4] H05B *37/00*; H02H *3/18*

U.S. Cl. 315—119 **5 Claims**

1. In a neon sign circuit having a neon tube forming the lighted portion of the sign, a source of electrical power, and a high voltage transformer between the electrical power source and the neon tube, the improvement comprising a neon sign circuit malfunction detector circuit including a ground fault detector connected in the circuit between the source of power and the transformer, to ground, and to the neutral load side of the primary windings of the transformer, a spark gap assembly connected to one of the secondary windings of the transformer between the transformer and the neon tube, said spark gap assembly including a spark gap, a neon light source connected between the spark gap and ground, and a light sensitive resistor positioned relative to the light source and connected between the ground connection of the ground fault detector and the neutral load connection between the transformer and the ground fault detector so that when a malfunction in the neon sign circuit occurs, a spark will jump the spark gap to energize the light source, increase the resistance of the light sensitive



resistor and cause the ground fault detector to cut off power to the transformer, as if it was sensing a ground fault.

4,882,523

DIRECT CURRENT MOTOR COMMUTATION CONTROL

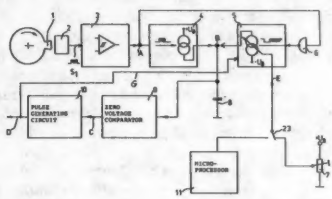
Mahr P. Denzlingen, Denslingen, Fed. Rep. of Germany, assignor to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Fed. Rep. of Germany

Filed Jul. 11, 1988, Ser. No. 217,401

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1987, 3724895

Int. Cl.[4] H02K *29/14*

U.S. Cl. 318—254 **14 Claims**



1. A method for controlling commutation of coil sets of a direct current motor with a fixed sensor, in which a sensor signal, S1, having a first period, T1, related to the speed of rotation of the motor rotor is generated during each revolution of the rotor, comprising the steps of: producing a control signal having a period equal to the sum of the first period, T1, and a second period, T2=K*T1, where K is a selected proportionality factor; and at the end of the period of the control signal, starting commutation of a first one of the coil sets.

8. An arrangement for controlling commutation of coil sets of a direct current motor with a fixed sensor, in which a sensor signal (S1) having a first period (T1) related to the speed of rotation of the motor rotor is generated during each revolution of the rotor, comprising: control signal producing means connected to the sensor for producing a control signal having a period equal to the sum of the first period (T1) and a second period (T2) proportional to the first period (T1); and commutation initiating means connected to said control signal producing means for starting commutation of a first one of the coil sets at the end of the period of the control signal.

4,882,524

MULTI-PHASE BIPOLAR BRUSHLESS D.C. MOTOR

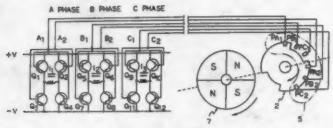
I Soo Lee, JangMi Apt. 9/B, 302-64, Ichon-Dong, YongSan-Ku, Seoul, Rep. of Korea

Filed Apr. 12, 1988, Ser. No. 180,373

Claims priority, application Rep. of Korea, Apr. 22, 1987, 87-3937[U]

Int. Cl.[4] H02K *29/10*

U.S. Cl. 318—254 5 Claims



1. A multi-phase bipolar brushless D.C. motor comprising:

a stator constituted by M phases, each phase having a plurality of windings which are connected in series and being connected independently of the winding connection of the other phases;

a rotor rotatably coupled to said stator and having N permanent magnet poles;

a commutation encoder fixed at one end of the rotor shaft outside the motor and assuming a cylindrical form comprising a circular plate and an annular ring, said annular ring having light shielding portions and light detecting portions which function, respectively, as non-sensing and sensing area, and each of said light detecting portions having opposite inclined portions, which is inclined to the edge of said light shielding portions at a given angle;

a photo-sensor coupled operatively with said commutation encoder and being constituted so that two photo-transistors are provided with respect to each phase, each of said photo-transistors in said M phases being arranged, inturn, one by one at intervals of predetermined shaft angle so as to produce a positive pulse when registered with said sensing area of said commutation encoder;

an electronic commutator constituted in such a manner that four power transistors are connected across the windings of each phase of said stator, two of siad four power transistors of each phase being connected to one photo-transistor of said photo-sensor so that each phase is provided with two photo-transistors so as to perform the determination of the current direction according to said positive pulse of said photo-transistors, thereby flowing the alternating current through the windings to drive the motor; and an electric power source connected in parallel to each phase of said electronic commutator.

4,882,525

METHOD FOR CONTROLLING THE WORKING FREQUENCY OF AN ELECTRO-ACOUSTIC VIBRATING DEVICE

Eric Cordemans De Meulenaer, Wezembeek, and Bandoin Hannecart, Brussels, both of Belgium, assignors to Undatim Ultrasonics S.A., Brussels, Belgium

Filed Aug. 30, 1988, Ser. No. 238,277

Claims priority, application Switzerland, Sep. 14, 1987, 32542/87

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—316 3 Claims

1. A method for controlling the working frequency of an ultrasonic device, comprising the steps of

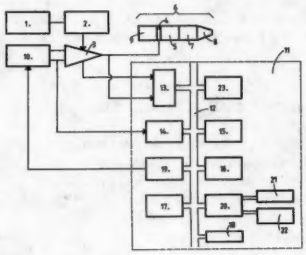
(a) periodically determining the frequency of the vibrating element for which the ultrasonic device power consumption is one of a minimum and for which its efficiency is maximum;

(b) comparing said determined frequency to a previously measured frequency of said vibrating element for which its power consumption was a minimum;

(c) repeating said frequency comparison several times;

(d) measuring the value of the frequency difference at each comparison;

(e) counting the number of successive comparisons providing as a result a value over a preset, predetermined value; and



(f) modifying the working frequency of the ultrasonic device of one step of a given frequency amplitude when a predetermined number of successive comparisons have a result over said preset value to adapt said working frequency to new working conditions, whereby said ultrasonic device always works at or near a frequency for which its efficiency is maximum.

4,882,526

ADAPTIVE PROCESS CONTROL SYSTEM

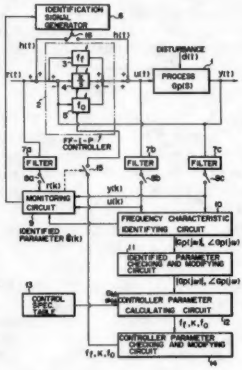
Yutaka Iino, and Takashi Shigemasa, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 10, 1987, Ser. No. 85,726

Claims priority, application Japan, Aug. 12, 1986, 61-187750; Aug. 20, 1986, 61-194578; Nov. 5, 1986, 61-262952

Int. Cl.[4] G05B *13/04*

U.S. Cl. 318—561 12 Claims



1. An adaptive process control system comprising:

set point means for generating a set-point signal which represents a target value of a process variable signal of a process to be controlled;

controller means for generating a manipulating signal which controls the process variable signal in accordance with the

set-point signal, the process variable signal, and controller parameters;

tuning means for superposing a persistently exciting identification signal on at least one of the set-point signal and the manipulating signal;

frequency characteristic identifying means for estimating an autoregressive moving average model of the process from sampling data of the process variable signal and sampling data of the manipulating signal by using a least square method, during a period in which said tuning means outputs the identification signal, identifying a pulse transfer function of the process, and obtaining a frequency characteristic of gain and phase of the process based on the pulse transfer function; and

controller parameter calculating means for adjusting the controller parameters of the controller means so that the frequency characteristics of gain and phase satisfy predetermined gain and phase margins.

11. An adaptive process control system comprising:

first calculating means for receiving a characteristic coefficient of a reference model exhibiting a desired waveform of a response of the adaptive process control system, and calculating gain and phase margins of the reference model; and

second calculating means for receiving the calculated gain and phase margins from said first calculating means, a transfer function of the adaptive process control system, and a signal representing a compensation mode of the adaptive process control system, and for removing the difference so that the gain and phase margins of the adaptive process control system coincide with those calculated by said first calculating means.

4,882,527
THREE-DIMENSIONAL MEASURING ROBOT

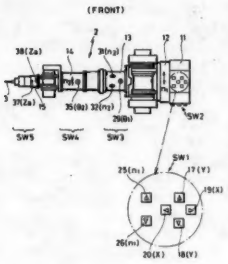
Takashi Yakuyama, Atsugi, and Toshiaki Ueda, Hiratsuka, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama and Tokyo Boeki Ltd., Tokyo, both of, Japan

Filed Oct. 17, 1988, Ser. No. 258,343

Claims priority, application Japan, Oct. 16, 1987, 62-259466; Oct. 16, 1987, 62-259468

Int. Cl.[4] G05B *19/42*

U.S. Cl. 318—568.13 **7 Claims**



1. A three-dimensional measuring robot, comprising:

(a) an orthogonal three-axis actuating mechanism having a main arm, for moving the main arm in three orthogonal directions;

(b) a multijoint arm including at least one rotary arm and one pivotal arm and attached to an end of said orthogonal three-axis actuating mechanism;

(c) a probe attached to an end of said multijoint arm, for detecting an object to be measured when brought into contact with the object;

(d) a plurality of manipulation switches arranged on an end of the main arm of said orthogonal three-axis actuating mechanism and on outer surfaces of the rotary and pivotal arms of said multijoint arm; and

(e) control means for storing data indicative of positions of the main, rotary and pivotal arms in teaching operation, when said probe is brought into contact with the object by use of said manipulation switches, and controlling movement of the plural arms on the basis of the stored data in playback operation.

4,882,528
DIGITAL SERVO SYSTEM

Masatoyo Sogabe, Hachioji; Kanemasa Okuda, Hino; Keiji Sakamoto, Hachioji, and Shunsuke Matsubara, Tokyo, all of Japan, assignors to Fanuc Ltd., Yamanashi, Japan

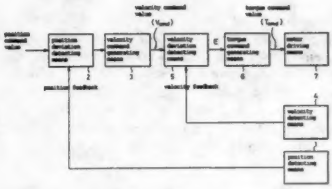
PCT No. PCT/JP87/00860, § 371 Date Jul. 8, 1988, § 102(e) Date Jul. 8, 1988, PCT Pub. No. WO88/03677, PCT Pub. Date May 19, 1988

PCT Filed Nov. 6, 1987, Ser. No. 233,644

Claims priority, application Japan, Nov. 8, 1986, 61-264881

Int. Cl.[4] G05B *19/29*

U.S. Cl. 318—600 **2 Claims**



1. A digital servo system comprising:

a position detecting means for detecting an actual position of an object;

a position deviation detecting means for detecting and for outputting a deviation of the actual position of the object from a predetermined position by a command;

a velocity command generating means for outputting a velocity command to move the object according to the output of the position deviation detecting means;

a velocity detecting means for detecting an actual velocity of the object;

a velocity deviation detecting means for detecting and for outputting a deviation of the actual velocity of the object from the velocity command;

a torque command generating means for outputting a torque command to drive a motor according to the output of the velocity deviation detecting means wherein the torque command increases according to a non-zero output of the velocity deviation detecting means up to a predetermined saturation value, and the torque command decreases swiftly down to zero at the time that the output of the velocity deviation detecting means becomes zero; and

a motor driving means for moving the object according to the torque command.

4,882,529
PULSE ENCODER

Katsuo Kobari, Tachikawa; Yoshitaka Takekoshi, Hachioji, and Mitsuyuki Taniguchi, Hino, all of Japan, assignors to Fanuc Ltd., Yamanashi, Japan

PCT No. PCT/JP87/00845, § 371 Date Jul. 6, 1988, § 102(e) Date Jul. 6, 1988, PCT Pub. No. WO88/03641, PCT Pub. Date May 19, 1988

PCT Filed Nov. 2, 1987, Ser. No. 238,211

Claims priority, application Japan, Nov. 7, 1986, 61-263966

Int. Cl.[4] G05B *19/28*

U.S. Cl. 318—602 **3 Claims**

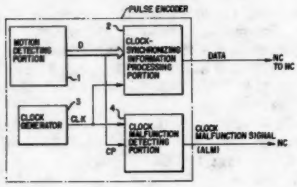
1. A pulse encoder comprising:

a motion detecting portion which detects a motion of an

object whose position should be measured, and which outputs a signal having information regarding the motion;

a clock generator which outputs a clock pulse;

a clock-synchronizing information processing portion which receives the signal having information regarding the motion and the clock pulse, and processes the information regarding the motion synchronized by the clock pulse; and



a clock malfunction detecting portion which receives the clock pulse and at least a part of the signal having information regarding the motion, said part of the signal having information showing whether or not the object, whose position should be measured, has moved or not, and said clock malfunction detecting portion outputs a clock malfunction signal when motion is detected by the part of the signal while the clock pulse is not output.

4,882,530

STEPPING MOTOR CONTROL APPARATUS

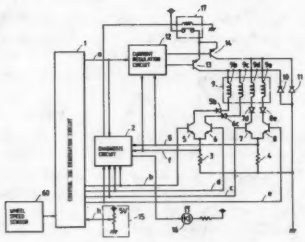
Hideki Kabune, Kariya; Kohji Kamiya, Chita; Kiyoshi Miyake, Kariya; Shigeru Saito, Kariya; Shinichi Yamada, Kariya, and Ken Asami, Nagoya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Filed Aug. 25, 1988, Ser. No. 236,181

Claims priority, application Japan, Aug. 29, 1987, 62-216034

Int. Cl.[4] G02P *8/00*

U.S. Cl. 318—696 **6 Claims**



1. An apparatus for controlling a stepping motor driving a throttle valve in an internal combustion engine, the stepping motor having a plurality of windings in different phases respectively, the apparatus comprising:

(a) first detecting means for detecting an all-phase de-energized state of the stepping motor in which all of the motor windings are de-energized;

(b) means for, after said first detecting means detects the all-phase de-energized state, sequentially energizing the motor windings in accordance with predetermined phase energization patterns, wherein each of said energizations of the motor windings lasts for a given interval chosen to allow the stepping motor to generate a starting torque greater than a predetermined load torque;

(c) second detecting means for detecting when said energization means completes energizations of the motor windings corresponding to one cycle of said phase energization patterns; and

(d) means for, after said second detecting means detects that one cycle of the phase energization patterns is completed, gradually shortening a plurality of durations of the energizations of the motor windings to increase a rotational speed of the stepping motor.

4,882,531

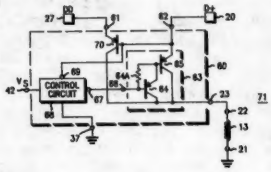
INTEGRATED CIRCUIT VOLTAGE REGULATOR AND CHARGING SYSTEM

Arthur J. Edwards, Hoffman Estates, Ill., and Randall C. Gray, Tempe, Ariz., assignors to Motorola Inc., Schaumburg, Ill.

Filed Sep. 26, 1988, Ser. No. 249,033

Int. Cl.[4] H02J *7/16*; H02P *9/10*

U.S. Cl. 322—60 **23 Claims**



1. A voltage regulator comprising:

first means for receiving a battery-supplied voltage at a first input terminal and coupling said battery-supplied voltage to another terminal to be connected to a field coil of an alternator to provide a voltage source for initial field coil excitation current;

second means for receiving at a second input terminal an alternator-supplied voltage varying in accordance with power output of said alternator, said second means including an output stage means providing an output signal at an output terminal, selectively and in accordance with a sensed variable input voltage, to control subsequent field coil excitation current provided from said alternator-supplied voltage subsequent to said initial field coil excitation current, said output terminal to be connected to said field coil with said output stage means in series with said field coil and said alternator-supplied voltage provided across the series connection of said field coil and said output stage means such that said alternator-supplied voltage provides a voltage ource for said subsequent field coil excitation current;

said first means including a semiconductor device which passes said initial field coil excitation current from said first input terminal to said field coil and prevents current flow from the alternator-supplied voltage at said second input terminal to said first input terminal,

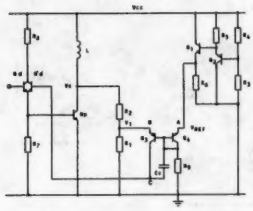
said second means being formed as part of a semiconductor integrated circuit (IC) with said second input terminal and said output terminal each corresponding to separate associated input and output external leads of said IC, respectively,

wherein the improvement comprises said semiconductor device comprising a transistor means for passing said initial field coil excitation current from said first input terminal through emitter and collector electrodes of said transistor means to one of said output and input external leads, a base electrode of said transistor means connected to circuitry means for turning said transistor on during the providing of said initial field coil excitation current and for turning said transistor off, and thereby preventing current flow between said emitter and collector electrodes, during the providing of said subsequent field coil excitation current.

4,882,532
ACTIVE OVERVOLTAGE CONTROL FOR INDUCTIVE LOAD DRIVING

Roberto Gariboldi, Lacchiarella, and Alberto Gola, Broni, both of Italy, assignors to SGS-Thomson Microelectronics, s.r.l., Italy

Filed Oct. 7, 1988, Ser. No. 254,763
Claims priority, application Italy, Oct. 9, 1987, 83662 A/87
Int. Cl.[4] H02M *3/137*; H02H *3/20*
U.S. Cl. 323—222 **1 Claim**



1. A circuit for limiting the transient overvoltage with an inductive load between as supply rail and a ground rail of the circuit and operated to switch ON and OFF said inductive load as a function of a switching signal applied to a control terminal of said power transistor, comprising:

a first voltage divider connected across said power transistor;

a second voltage divider connected between said supply rail and said ground rail;

at least a unity gain buffer having an input terminal and an output terminal, the input terminal of which is connected to an intermediate node of said second voltage divider; and

a voltage comparator having first and second input terminals and an output terminal, the first input terminal being connected to an intermediate node of said first voltage divider and the second input terminal being connected to the output terminal of said buffer;

the output terminal of said comparator being connected to said control terminal of said power transistor;

the intermediate nodes of said two voltage dividers being chosen such that, when the overvoltage across said first voltage divider rises beyond a limit value set by said second voltage divider, the comparator changes state and the level of the signal at the output terminal thereof becomes sufficient to switch-ON said power transistor.

4,882,533
LINEAR INTEGRATED CIRCUIT VOLTAGE DROP GENERATOR HAVING A BASE-10-EMITTER VOLTAGE INDEPENDENT CURRENT SOURCE THEREIN

Mark Kelley, Nashua, N.H., assignor to Unitrode Corporation, Lexington, Mass.

Continuation of Ser. No. 90,336, Aug. 28, 1987, abandoned. This application Feb. 15, 1989, Ser. No. 312,373
Int. Cl.[4] G05F *3/16*
U.S. Cl. 323—313 **13 Claims**

1. A voltage drop generator comprising

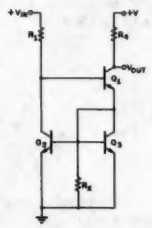
a first, second and third transistor each having an emitter, a base and a collector;

a first resistor having one end connected to a common connection and the other end connected to the emitter of the first transistor, the base of said second transistor, the base of the third transistor, and the collector of said third transistor;

a second resistor having one end connected to both the collector of said second transistor and to the base of the first transistor and the other end connected to a control signal relative to said common connection;

a third resistor having one end connected to a supply potential and the other end connected to the collector of the first transistor developing a voltage drop thereacross in response to a control voltage, wherein,

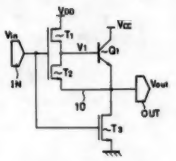
the emitter of said second and said third transistor is connected to said common connection providing a return for said supply potential connected to said third resistor, and said voltage drop generator provides reduced sensitivity to variations of V_{BE} and temperature of said first, second and third transistors.



4,882,534
BIPOLAR-COMPLEMENTARY METAL OXIDE SEMICONDUCTOR INVERTER

Atsuo Koshizuka, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Aug. 31, 1988, Ser. No. 238,404
Claims priority, application Japan, Sep. 11, 1987, 62-228733
Int. Cl.[4] G05F *1/10*
U.S. Cl. 323—351 **6 Claims**



1. A bipolar-complementary metal oxide semiconductor (Bi-CMOS) inverter comprising:

a complementary metal oxide semiconductor (CMOS) inverter including a p-channel MOS transistor and an n-channel MOS transistor each having a gate, a source and a drain, an input voltage being applied to the gates of the MOS transistors;

a bipolar transistor having a base, collector and emitter, the base of the bipolar transistor being connected to an output of the CMOS inverter, the emitter of the bipolar transistor being connected to the source of the n-channel MOS transistor, an output voltage of the Bi-CMOS inverter being obtained at the emitter of the bipolar transistor; and

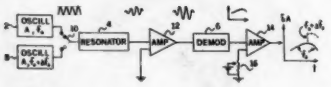
means for discharging the output of the CMOS inverter and an output of the emitter of the bipolar transistor, when the input voltage is switched from a low level to a high level.

4,882,535

DEVICE AND METHOD FOR MONITORING SMALL DESPLACEMENTS OF A PEAK IN A FREQUENCY SPECTRUM

Benjamin Gavish, Jerusalem, Israel

Filed Nov. 24, 1986, Ser. No. 933,896
Claims priority, application Israel, Dec. 3, 1985, 77207
Int. Cl.[4] G01R *27/26, 27/02*
U.S. Cl. 324—585 C **12 Claims**



1. An electronic device for monitoring changes in characterizing properties of a tested sample by observing displacements of a selected point on a curve of aa frequency spectrum of a tested sample, which displacement results from a movement of all points on a frequency spectrum curve along a frequency axis, comprising

generator means for generating two continuous waves each of a predetermined constant frequency and of an identical constant amplitude;

resonating means applicable to a tested sample to form a resonating system, said system being connected in circuit to said generaator means and driven thereby when said continuous waves differs from the resonance frequency of said resonating system and being confined to a lower or higher frequency than the resonance frequency, and

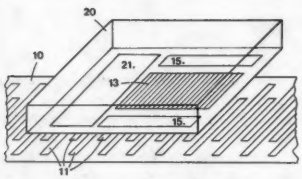
circuit means for continuously demodulating the output signal of said resonating system to form an amplitude modulated waveform representative, of the instantaneous displacements of said selected point occuring when said continuous wave is passed through the tested sample, which waveform is capable of being displayed for real time monitoring of property changes of the tested sample expressed in terms of frequency shifts.

4,882,536

CAPACITIVE DETECTOR OF POSITION HAVING ELECTRODES AND CIRCUITRY FORMED ON A COMMON INTEGRATED CIRCUIT

Hans U. Meyer, 42 rue de Lausanne, 1110, Morges, Switzerland

Continuation of Ser. No. 036,806, Apr. 10, 1987, abandoned.
This application Dec. 12, 1988, Ser. No. 284,782
Claims priority, application Switzerland, Apr. 10, 1986, 0141286
Int. Cl.[4] G01R *27/26*
U.S. Cl. 324—61 R **9 Claims**



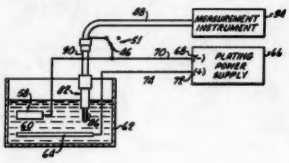
1. A capacitive detector of the relative position between two supports, one of these supports being displaceable along the other, one support comprising a series of electrodes, the second support being provided with electrodes and electronic circuitry making it possible to apply incremental potentials to the latter electrodes, the electrodes in one support facing those in the other support, characterized in that the electrodes on the second support and the electronic circuitry for applying the incremental potentials to the electrodes on the second support are formed in a common integrated circuit semiconductor substrate disposed facing the electrodes on the other support.

4,882,537

METHOD AND APPARATUS FOR REDUCING INTERFERENCE IN AN ELECTRICAL RESISTANCE PROBE DURING ELECTROLYTIC PLATING

Herbert P. Silverman, Yellow Springs, Ohio, assignor to Rohrback Cosasco Systems, Inc., Santa Fe Springs, Calif.

Filed May 9, 1988, Ser. No. 191,384
Int. Cl.[4] G01R *27/00*
U.S. Cl. 324—65 R **15 Claims**



1. A method of monitoring a process for plating a selected material upon an object immersed in an electrolytic bath comprising the steps of:

forming a monitoring sensor with an electrically conductive test element,

immersing the monitoring sensor in said electrolytic bath with the test element in contact with the bath,

starting the plating process to cause plating current to flow in current paths between a power supply and the monitoring sensor and between the power supply and the object to be plated, thereby to cause both the object and test element to be plated with said material,

momentarily interrupting flow of current between the power supply and the monitoring sensor, and

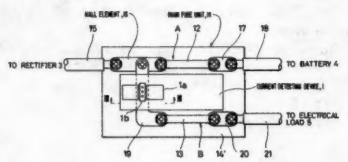
while said current is interrupted measuring the electrical resistance of said test element.

4,882,538

DEVICE FOR DETECTING CURRENT FLOWING IN AN ELECTRIC WIRE

Hiromitsu Sato; Shinichi Kubota; Atsushi Totsune, and Masahiko Asakura, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 3, 1987, Ser. No. 92,459
Claims priority, application Japan, Sep. 4, 1986, 61-208480
Int. Cl.[4] G01R *11/34, 19/00*
U.S. Cl. 324—127 **5 Claims**



1. A current detecting device for detecting current flowing in a first electric wire arranged close to a second electric wire having a portion extending in a predetermined direction, said second electric wire extending between a device of an automotive vehicle and a battery of said automotive vehicle, said first electric wire extending from a portion of said second electric wire located in a fuse unit to at least one electrical load, comprising:

a portion of said first electric wire extending at right angles to said portion of said second electric wire;

a magnetic core arranged around said portion of said first electric wire, said magnetic core having an axis thereof extending at right angles to said portion of said second electric wire; and

magnetic-to-electric transducer means associated with said magnetic core for generating an electric signal indicative of the intensity of a magnetic field generated around said portion of said first electric wire by current flowing in said first electric wire.

4,882,539

MONITORING SYSTEM FOR ELECTRODYNAMIC WALL-THICKNESS AND DEFECT TESTING USING A DELAY LINE

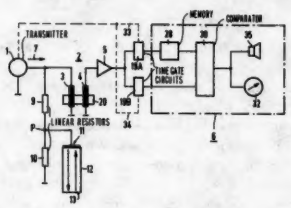
Joerg Quittkat, Neuberg, and Gerhard Thiel, Freigericht, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Mar. 7, 1988, Ser. No. 164,575

Claims priority, application Fed. Rep. of Germany, Mar. 5, 1987, 3707048

Int. Cl.[4] G01B 7/02; G01N 27/82

U.S. Cl. 324—229 **13 Claims**



1. Monitoring system monitoring electrical components of an apparatus for electrodynamic wall-thickness and defect testing, comprising a transmitter generating brief signals, an electrodynamic converter having a transmitter coil connected to said transmitter for receiving the brief signals and feeding the brief signals into a workpiece to be tested in which the brief signals are reflected, said electrodynamic converter having a receiver coil receiving the reflected signals, an amplifier connected to said receiver coil for receiving the reflected signals, an evaluation unit connected to said amplifier for receiving the reflected signals, and at least one damping element and a delay line connected to said transmitter for delaying and damping the brief signals, said delay line being coupled through said electrodynamic converter to said evaluation unit so as to feed the delayed and damped signals into the transmitter coil of said electrodynamic converter.

4,882,540

MAGNETIC RESONANCE IMAGING (MRDAPPARATUS WITH QUADRATURE RADIO FREQUENCY (RF) COILS

Robert Domenick, Palo Alto; Phillip Foreman, Santa Clara; David M. Parish, Palo Alto, and Donald W. Pettibone, Cupertino, all of Calif., assignors to Resonex, Inc., Sunnyvale, Calif.

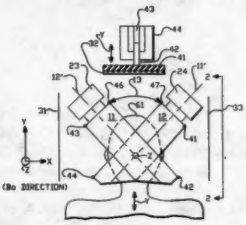
Filed Jun. 28, 1988, Ser. No. 213,576

Int. Cl.[4] G01R 33/20

U.S. Cl. 324—318 **12 Claims**

1. Magnetic resonance imaging (MRI) apparatus having a main magnetic field B_0, with a predetermined direction, and having a pair of radio frequency (RF) coils for picking up spin echo or free induction decay RF signals from a test specimen surrounded by said coils, which are in quadrature phase comprising:

first and second said RF coils surrounding a volume to be imaged in which a said test specimen would normally reside, each of said coils, including a foil band of conductive material forming a loop around an axis, said coils having a common diameter in said direction of B_0 perpendicular to said axis of each coil, said coils being positioned



in said main magnetic field so that a plane defined by the intersection of the axes of the loops is perpendicular to said main magnetic field, said axes forming an angle with each other to provide said quadrature phase signals.

4,882,541

AUTOMATIC IMPEDANCE ADJUSTER FOR MRI SYSTEM

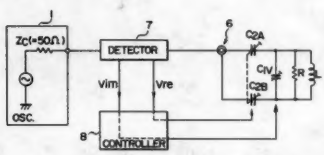
Motoji Haragashira, Ootawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 5, 1988, Ser. No. 190,451

Claims priority, application Japan, May 8, 1987, 62-111942

Int. Cl.[4] G01R 33/20

U.S. Cl. 324—322 **7 Claims**



1. An automatic impedance adjuster for adjusting an impedance of a probe head in an MRI (magnetic resonance imaging) system to be equal to characteristic impedance, comprising:

an impedance adjusting element, provided to said probe head, for allowing variable adjustment of real and imaginary parts of an impedance of said probe head;

oscillator means, having a predetermined output impedance, for supplying a signal to said probe head;

detection means, connected between said probe head and said oscillator means, for outputting detection signals respectively corresponding to the real and imaginary parts of the impedance of said probe head based on the output from said oscillator means supplied to said probe head; and

control means, responsive to the signals corresponding to the real and imaginary parts obtained from said detection means, for supplying, to said impedance adjusting element of said probe head, a control signal for adjusting the real and imaginary parts of the impedance of said probe head to coincide with a predetermined impedance,

said detection means comprising a series circuit of first to fourth $\lambda/8$ cables connected between said oscillator means and said probe head, a first variable resistor connected to two ends of a series circuit of said first and second $\lambda/8$ cables each through diodes of predetermined polarities, and a second variable resistor connected to two ends of a series circuit of said second and third $\lambda/8$ cables each

through diodes of predetermined polarities, and outputs voltages corresponding to the real and imaginary parts of the impedance from slider terminals of said first and second variable resistors, respectively.

4,882,542

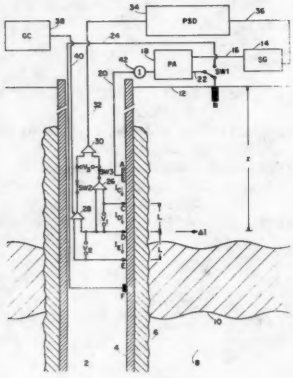
METHODS AND APPARATUS FOR MEASUREMENT OF ELECTRONIC PROPERTIES OF GEOLOGICAL FORMATIONS THROUGH BOREHOLE CASING

William B. Vail, III, Bothell, Wash., assignor to ParaMagnetic Logging, Inc., Bothell, Wash.

Continuation-in-part of Ser. No. 927,115, Nov. 4, 1986, Pat. No. 4,820,989. This application Aug. 26, 1987, Ser. No. 89,697

Int. Cl.[4] G01V *3/02*

U.S. Cl. 324—368 80 Claims



29. An apparatus for measuring electrochemical phenomena of formations adjacent to a borehole casing including polarization effects, the skin effects of casing, dielectric constant effects, and the resistivity of formations, comprising:

introduction means for selectively causing a time varying measuring current to enter the casing at a point in the proximity of the specific portion of the formation of interest;

receiving means for receiving at least a portion of the current at a point sufficiently remote from the current entry point to insure that a majority of the current introduced by said current introduction means enters the formation from the casing;

voltage measuring means for detecting the magnitude and phase of the time varying voltage level at a multiplicity of at least three spaced apart voltage measuring points along the casing adjacent the specific portion of the formation of interest; and

differential means for simultaneously measuring the magnitudes and phases of the time varying differential voltages between a plurality of discrete pairs of said voltage measuring points to provide information about the specific formation of interest, said differential means producing a first differential voltage output indicative of the differential voltage between a first discrete pair of voltage measuring points and a second differential voltage output indicative of the differential voltage between a second discrete pair of voltage measuring points, said information including polarization effects, the skin effects of casing, dielectric constant effects, and the resistivity of formations.

4,882,543

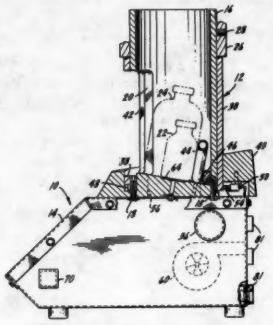
VACUUM TESTING APPARATUS HAVING A TEST ENCLOSURE WITH A ROTATABLE SLEEVE

Burton L. Siegal, Skokie, Ill., assignor to Electro-Technic Products, Inc., Chicago, Ill.

Filed Aug. 1, 1988, Ser. No. 226,872

Int. Cl.[4] G01L *23/16, 21/30*

U.S. Cl. 324—460 16 Claims



1. An apparatus for testing the vacuum of an evacuated vial, comprising

a. a test enclosure of said vial, said enclosure having an access opening,

b. cover means connected to said enclosure and positionable in a first orientation to cover said access opening and in a second orientation to expose said access opening through said cover means,

c. means at said test enclosure for externally applying high voltage radio frequency power to said vial,

d. illumination means in said test enclosure for applying a momentary intense flash of light to the vial of sufficient magnitude to cause ignition of gas within the vial,

e. means to energize said illumination means only when said cover means is positioned in said first orientation after reposition of said cove means from said second orientation to said first orientation, and

f. means for sensing the ionization current of ionized gas within said vial and generating a signal if the sensed ionization current exceeds a predetermined minimum value indicative of a predetermined minimum value of the vacuum of the vial.

4,882,544

SIMPLE INSPECTION DEVICE FOR ANALYZER FOR IONIC ACTIVITY MEASURMENT

Tadashi Uekusa; Takashi Koizumi, and Nobuhiko Amano, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 106,467, Oct. 9, 1987. This application Dec. 21, 1988, Ser. No. 287,379

Claims priority, application Japan, Oct. 9, 1986, 61-241010; Apr. 17, 1987, 62-94551

Int. Cl.[4] G01R *31/02*

U.S. Cl. 324—511 5 Claims

1. A method for testing operability of an analyzer for ionic activity measurement by use of an inspection device, the analyzer having at least two potential difference measuring probes, the inspection device having first and second electrically non-conductive members supporting at least one electrically conductive member therebetween, one of the non-conductive members having apertures formed therein, the method comprising the steps of:

(i) positioning the inspection device so as to receive the

probes through the apertures to electrically connect the probes; and

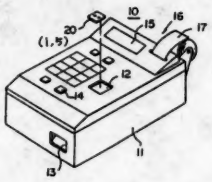
(ii) determining an electric potential difference between the probes.

2. An analyzer for ionic activity measurement and an inspection device for testing the functions of the analyzer, said analyzer comprising:

an ionic activity measuring device having at least one ion selective electrode pair for generating an electric potential corresponding to ionic activity of a predetermined ion, and a porous bridge connecting the electrodes of said ion selective electrode pair with each other;

a measurement device holder removably supporting said ionic activity measuring device; and

a plurality of potential difference measuring probes mounted



for movement towards and away from respective electrodes of said ionic activity measuring device supported by said measuring device holder, to thereby measure a difference in potential between said electrodes,

wherein said inspection device is mountable on said holder in lieu of said ionic activity measuring device, and said inspection device comprises:

electrically non-conductive supporting means for being removably supported by said holder; and

an electrically conductive member supported on said supporting means for contacting said potential difference measuring probes to short-circuit said probes to thereby indicate one of operability and inoperability of said analyzer, said supporting means being formed with access means for allowing said electrically conductive member to be contacted by said probes.

4,882,545

CIRCUIT ARRANGEMENT FOR DETECTING A CRITICAL FREQUENCY OF INPUT PULSES

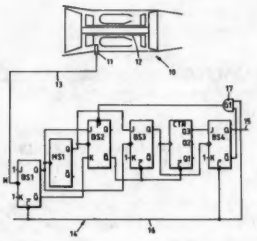
Anthony B. Plant, Birmingham, England, assignor to Lucas Industries Public Limited Company, Birmingham, England

Filed Feb. 8, 1988, Ser. No. 153,069

Claims priority, application United Kingdom, Feb. 26, 1987, 8704499

Int. Cl.[4] H03K *9/06*; H03D *3/60*

U.S. Cl. 328—138 **5 Claims**



1. A circuit arrangement responsive to a train of input pulses for generating a critical speed signal at a critical frequency of said pulses, comprising a circuit for generating first clock signals at one edge of each recurring ones of said pulses, a monostable circuit responsive to said first clock signals for generating timed pulses whose duration is equal to that of a predetermined number of said input pulses at said critical frequency, a circuit responsive to an edge of said timed pulses and to one level of said first clock signals for generating an enabling signal, a bistable circuit responsive to said enabling signal, to said first clock signals and to said timed pulses for generating second clock signals, and a counting circuit responsive to said enabling signal and to said second clock signals for generating a critical speed signal after a predetermined number of said second clock signals.

4,882,546

DEMODULATION CLOCK GENERATOR CIRCUIT

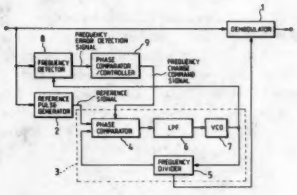
Yoshinobu Takamura, Tokyo; Norimichi Katsumura; Nebuhiko Osawa, both of Yamanashi, and Kazuo Watanabe, Yamanashi, all of Japan, assignors to Pioneer Electronic Corporation, Tokyo and Pioneer Video Corporation, Yamanashi, both of, Japan

Filed Jan. 19, 1989, Ser. No. 299,097

Claims priority, application Japan, Jun. 30, 1988, 63-163425

Int. Cl.[4] H03D *3/00*

U.S. Cl. 329—310 **3 Claims**



1. A demodulation clock generator circuit comprising:

signal generating means for supplying a reference signal synchronized with state transitions of a signal to be demodulated by modulating a digital data signal and adding a synchronized signal with a predetermined wave-form;

oscillating means oscillating at a frequency corresponding to a magnitude of a control signal;

comparison means for supplying a phase difference signal as said control signal to said oscillating means based on a difference between said reference signal and a signal output by said oscillating means;

frequency detection means for generating a frequency detection signal corresponding to the frequency of said signal output by said oscillating means according to the distance between state transitions in a synchronization signal portion of said signal to be demodulated; and

frequency changing means for changing the frequency of said signal output by said oscillating means according to said frequency detection signal.

4,882,547

LINEARIZER CONTROL SYSTEM

Allen Katz, West Windsor Township, Mercer County, N.J., assignor to General Electric Company, East Windsor, N.J.

Filed Nov. 15, 1988, Ser. No. 271,469

Int. Cl.[4] H03F *1/32*

U.S. Cl. 330—149 **18 Claims**

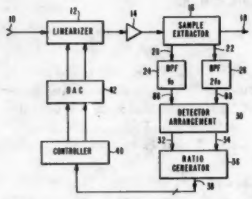
1. An active device arrangement, comprising:

active signal translating means including input and output ports, said translating means being adapted to receive signals at said input port for translating said signals applied to said input port for producing translated signals at said

output port, the process of translation being accompanied by distortion;

controllable linearizer means coupled to at least one port of said signal translating means for controllably distorting signals applied thereto;

first filter means coupled at least to said output port of said signal translating means, said first filter means being tuned to pass the frequencies of said signal which said signal translating means is adapted to receive at said input port and to reject a particular harmonic thereof for producing first filtered signals;



second filter means coupled at least to said output port of said signal translating means, said second filter means being tuned to pass at least said particular harmonic for thereby producing second filtered signals;

signal processing means coupled to said first and second filtering means for forming a processed signal representative of the ratio of said first and second filtered signals; and

control means coupled to said signal processing means and to said controllable linearizer means for adjusting said controllable linearizer means in a manner which tends to minimize said processed signal.

4,882,548

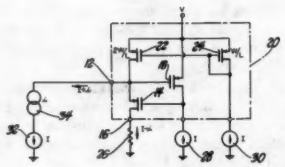
LOW DISTORTION CURRENT MIRROR

Jeffrey J. Marrah; Gregory J. Manlove, both of Kokomo, and Richard A. Kennedy, Russiaville, all of Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.

Filed Dec. 22, 1988, Ser. No. 288,372

Int. Cl.[4] H03F *3/16*

U.S. Cl. 330—288 **7 Claims**



1. A current mirror producing a low total harmonic distortion output signal, said current mirror comprising;

a first current path including an input terminal for carrying an input signal comprising a DC component modulated by an AC component,

a second current path comprising an output terminal and a transistor coupling the input terminal to the output terminal, said transistor including a control element,

a current source for coupling to the input terminal a constant current two times the DC component of the input signal, whereby the output signal is the difference of the input signal and the constant current, and

an amplifier having an input from the input terminal and its output connected to the control element of the transistor for providing a high gain feedback to maintain a constant voltage at the input terminal, thereby affording low harmonic distortion in the output signal.

4,882,549

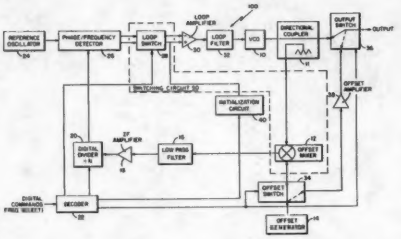
CENTER OFFSET MICROWAVE FREQUENCY SYNTHESIZER

Zvi Galani, 3 Birchwood Dr., Bedford, Mass. 01730; Malcolm E. Skinner, 67 Walnut Ave., Andover, Mass. 01810, and John A. Chiesa, 34 Locust St., Dracut, Mass. 01826

Filed Nov. 16, 1988, Ser. No. 272,044

Int. Cl.[4] H03L *7/18*

U.S. Cl. 331—14 **4 Claims**



1. In the operation of an improved microwave frequency signal source using an indirect frequency synthesizer architecture including a voltage-controlled oscillator (VCO), responsive to a control signal having either one of two polarities which produces a microwave frequency output signal within a predetermined band of microwave frequencies, the method comprising the steps of:

(a) producing an offset frequency signal having a frequency approximately at the middle of a predetermined band of microwave frequencies and heterodyning the offset frequency signal with the output signal of the VCO, thereby forming an intermediate frequency (I.F.) signal having a frequency indicative of the magnitude of the difference between the frequency of the offset frequency signal and the output signal of the VCO;

(b) dividing the I.F. signal by a predetermined division ratio producing a frequency divider output signal having a frequency lower than the frequency of the I.F. signal;

(c) forming a first portion of the control signal with an amplitude in accordance with the frequency divider output signal; and

(d) changing the polarity of the first portion of the control signal in accordance with the frequency of the output signal of the VCO relative to the frequency of the offset frequency signal to produce the control signal to be applied to the VCO.

4,882,550

OSCILLATOR/AMPLIFIER CONNECTING STRUCTURE

Toshiki Baba, Odaka, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed Feb. 7, 1989, Ser. No. 307,439

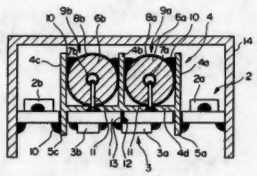
Claims priority, application Japan, Apr. 12, 1988, 63-48850

Int. Cl.[4] H03B *5/18*; H04B *1/50*; H05K *7/08*

U.S. Cl. 331—49 **1 Claim**

1. A connecting structure for an oscillator comprising a printed circuit board, two oscillator circuits provided on one surface of said printed circuit board and including dielectric resonators, an amplifier circuit provided on the other surface of said printed circuit board for selectively amplifying oscillatory outputs from said oscillator circuits, and a metal plate

mounted on said printed circuit board, wherein said dielectric resonators are juxtaposed on said metal plate and fixed thereto,



and said amplifier circuit is located at a position opposite to said metal plate.

4,882,551

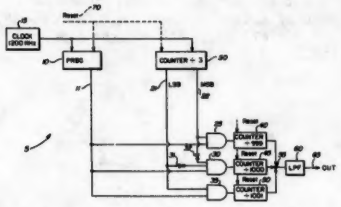
400 HERTZ HARMONIC GENERATOR

Paul A. Singer, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 11, 1989, Ser. No. 351,617

Int. Cl.[4] H03B *29/00*

U.S. Cl. 331—78 **8 Claims**



1. An apparatus for simulating a range of fluctuating electronic signals comprising:

a clock having a predetermined clock signal;

a psuedo-random bit generator means coupled to the clock for generating a digital data stream of random zeros and ones;

divider means connected to said clock for providing gating signals at a predetermined rate of said clock signal;

means connected to said pseudo random bit generator means to receive said digital data stream and connected to said divider providing means to receive said gating signals for demultiplexing said ones of said digital data stream into a plurality of random ones signals in accordance with said predetermined rate of said gating signals;

means connected to said demultiplexing means for summing said plurality of said random ones signals;

means coupled to receive said plurality of said random ones signals for filtering thereof to provide said range of said fluctuating signals.

4,882,552

COHERENT FREQUENCY EXCHANGE KEYING MODULATOR

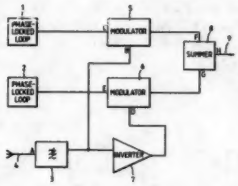
Robert M. Harris, Aldershot, England, assignor to The Secretary of State of or Defence in Her Britannic Majesty's Government of The United Kingdom of Great Britain and Northern Ireland, London, England

Filed Jan. 12, 1989, Ser. No. 296,243

Claims priority, application United Kingdom, Jan. 20, 1988, 8801259

Int. Cl.[4] H04L *27/12*

U.S. Cl. 332—100 **5 Claims**



1. Signal modulation apparatus for the transmission of a binary data signal consisting of means for filtering the binary data signal to produce a base-band signal, means for generating two carrier waves the difference between whose frequencies is substantially an integral multiple of the bit-rate of the binary data signal, means for amplitude modulating the two carrier waves by the base-band signal and an inverted version thereof respectively and means for adding the two amplitude-modulated carrier waves to produce a frequency-modulated waveform.

4,882,553

MICROWAVE BALUN

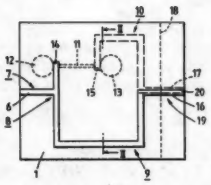
Robert Davies, Copthorne, England; Percy W. Hoare, Hussocks, United Kingdom, and Peter J. Gibson, Crawley, England, assignors to U.S. Philips Corp., New York, N.Y.

Filed Sep. 21, 1988, Ser. No. 247,139

Claims priority, application United Kingdom, Sep. 25, 1987, 8722638

Int. Cl.[4] H01P *5/10*

U.S. Cl. 333—26 **19 Claims**



1. A balun having an unbalanced port comprising a first unbalanced transmission line and a balanced port comprising a balanced transmission line formed by two adjacent elongate strip conductors of substantially the same widths between which in operation of substantially the same widths between which in operation an electric field extends, wherein the two strip conductors are coupled to the unbalanced port by respective paths of substantially the same effective electrical lengths, wherein the paths comprise adjacent respective further unbalanced transmission lines which are strip transmission lines having a common ground conductor, wherein there is a transi-

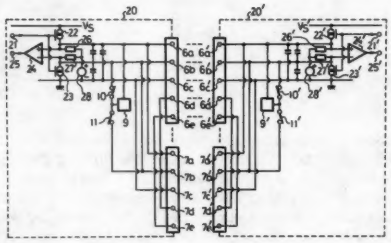
tion from the adjacent unbalanced lines to said balanced line in which transition the common ground conductor terminates, and wherein at least one of the paths comprise slot line means and strip transmission line-to-slot line coupling means so arranged. as in operation to provide in the two strip conductors from an RF signal in the first unbalanced line RF signals of mutually opposite phases with respect to the common ground conductor.

4,882,554

MULTI-DROP TYPE BUS LINE SYSTEM

Yukio Akaba, Chiba, and Akihiko Sakuramoto, Tokyo, both of Japan, assignors to Sony Corp. and SMK Co., Ltd., both of Tokyo, Japan

Filed May 24, 1988, Ser. No. 197,980
Claims priority, application Japan, May 29, 1987, 62-135541
Int. Cl.[4] H03H *7/38*
U.S. Cl. 333—105 **21 Claims**



1. A multi-drop type bus line system comprising:
(a) a plurality of terminals, each of said terminals including at least first and second connectors, each of said first and second connectors including a plurality of connection pins arranged so that corresponding connection pins of said first and second connectors are electrically connected to each other and said connection pins are respectively electrically connected to a circuit provided within each of said plurality of terminals;
(b) connection cable means for coupling a connector of one terminal to a connector of another terminal so as to enable signal transmission between the terminals;
(c) switching means provided in said connector of each terminal and being operated each time said connection cable means is coupled to said connector;
(d) interline impedance means connected between predetermined connection pins of said first and second connectors; and
(e) means for removing said interline impedance means when said connection cable means is coupled to said connector by operation of said switching means, thereby impedance matching between a bus line and a terminal is improved.

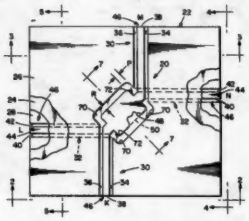
4,882,555

PLURAL PLANE WAVEGUIDE COUPLER

Mon N. Wong, Torrance, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Aug. 12, 1988, Ser. No. 231,326
Int. Cl.[4] H01P *5/18*
U.S. Cl. 333—116 **9 Claims**

9. A coupler of electromagnetic power comprising:
a first electrically-conductive sheet;
a second electrically-conductive sheet;
means for supporting said second sheet parallel to said first sheet and spaced apart therefrom;
a first coplanar waveguide disposed in said first sheet;
a second coplanar waveguide disposed in said second sheet, each of said coplanar waveguides being formed as a pair of slots within a conductive sheet, the pair of slots being spaced apart to define a central strip conductor; and wherein
in said first waveguide, there is a widened portion of each slot of said pair of slots and a widened portion of said strip conductor located within said widened slot portion, said widened portion of said strip conductor of said first waveguide being formed as a first elongated pad;



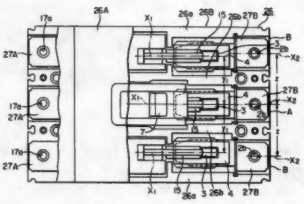
in said second waveguide, there is a widened portion of each slot of said pair of slots and a widened portion of said strip conductor located within said widened slot portion, said widened portion of said strip conductor of said second waveguide being formed as a second elongated pad; and
said first pad is disposed in registration with said second pad for coupling electromagnetic power between said first and said second waveguides.

4,882,556

MULTI-POLE CIRCUIT INTERRUPTER

Hiroshi Fujii; Tsukasa Iio; Yasusi Genba; Hideaki Moriwaki, and Yoshinori Mochizuki, all of Midori, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Continuation of Ser. No. 92,945, Sep. 4, 1987, abandoned. This application Nov. 1, 1988, Ser. No. 267,617
Claims priority, application Japan, Sep. 9, 1986, 61-138780[U]
Int. Cl.[4] H01H *71/00*; H02B *1/08*
U.S. Cl. 335—8 **1 Claim**



1. A multi-pole circuit interrupter comprising:
an electrically insulating housing having two side walls and at least two partition walls defining therebetween a central compartment and at least two side compartments, said side walls and partition walls all being substantially parallel and transverse to the width of said housing;
a central pole unit disposed within said central compartment and having a stationary contact element, a movable contact arm, an arc extinguisher, and a pair of terminals having a common center line with the central pole unit for external connections; and
a side pole unit disposed within each of said side compartments, each side pole unit having a stationary contact element, a movable contact arm, an arc extinguisher, and

a pair of terminals having a common side pole terminal center line for external connections,

wherein the stationary contact element, the movable contact arm, and the arc extinguisher of each of the side pole units are offset with respect to the center lines of the terminals thereof in a direction toward the central pole unit and the distances from the center line of the central pole unit, the center line of the central pole unit passing through the centers of the stationary contact element, the movable contact arm, and the arc extinguisher of the central pole unit, to center lines passing through the centers of the stationary contact elements, the movable contact arms and the arc extinguishers of the side pole units are smaller than the distances from the center line of the central pole unit and the side pole terminal center lines, all of the center lines being generally parallel to each other and to said partition walls, whereby the spacing between the center pole unit and the respective side pole units may be increased without increasing the width of the housing.

4,882,557

MULTIPOLE CIRCUIT BREAKER SYSTEM WITH DIFFERENTIAL POLE OPERATION

George S. Harper, Cambridge, Md., assignor to Airpax Corporation, Cambridge, Md.

Filed Nov. 13, 1987, Ser. No. 120,479
Int. Cl.[4] H01H *75/00*
U.S. Cl. 335—9 **14 Claims**

1. A multipole circuit breaker system comprising:

a handle movable to make or break contact;

a plurality of breaker assemblies of first and second types, each said breaker assembly comprising:

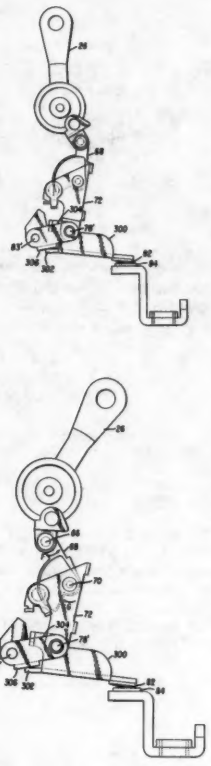
(a) movable contact means for electrically contacting a fixed contact means;

(b) a collapsible toggle, mechanically connected to said handle and to said movable contact means in such relation that collapse of said toggle permits said movable contact means to move away from said fixed contact means;

said assemblies of said second type, but not said assemblies of said first type, further comprising a contact bar means and a contact bar carrier means, wherein

(1) said contact bar carrier means is pivotably mounted at a first connection; and

(2) said contact bar means and said contact bar carrier means are pivotably connected together at a second connection, apart from said first connection such that overtravel in



response to movement of said handle to make contact occur at said second connection.

4,882,558

SOLENOID ASSEMBLY

Makoto Takayanagi, Aichi, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Feb. 21, 1989, Ser. No. 312,154
Claims priority, application Japan, Feb. 18, 1988, 63-36186
Int. Cl.[4] H01F *7/08*
U.S. Cl. 335—260 **2 Claims**

1. A solenoid assembly comprising:

a magnetic core;

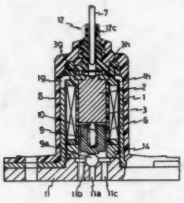
a coil bobbin having a longitudinal axis and hook means thereon extending in the longitudinal direction of the bobbin axis from a flange formed on one end thereof with an end portion of said hook means projecting radially outwardly from said axis; said bobbin having a central bore with at least a portion of said core disposed therein and a coil wound around said bobbin;

a magnetic yoke connected to said core and partially surrounding said coil and having opening means through which said hook means extend;

a magnetic plunger movably disposed in said bore adjacent said core;

a grommet having a base portion disposed in contact with

said yoke and engaged by said hook means and a neck portion extending along the axis of said bobbin away from said base portion and having an opening for a lead wire in said neck portion;



a lead wire extending through said opening of said neck portion and connected to one end of said coil; and

a casing made of plastic molded in situ and covering said grommet and an exterior portion of said yoke continuously.

4,882,559

PERMANENT MAGNET TYPE DEMAGNETIZING HEAD

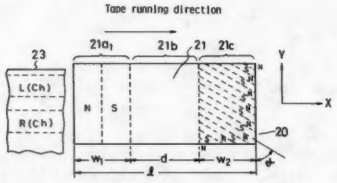
Noboru Koizumi, Hirakata, and Kazuya Yamazaki, Neyagawa, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Dec. 10, 1987, Ser. No. 131,392

Claims priority, application Japan, Dec. 10, 1986, 61-294042; Jul. 8, 1987, 62-170257

Int. Cl.[4] H01F *13/00*

U.S. Cl. 335—284 **6 Claims**



1. A permanent magnet type demagnetizing head comprising:

a first magnetic part of a magnetic material which is disposed on a front part of a tape running surface in a tape running direction and magnetized in a magnetic pattern having at least one N-pole region and S-pole region,

a second magnetic part of said magnetic material which is disposed on a rear part of said tape running surface in the tape running direction and magnetized in a magnetic pattern having plural regions alternating N-pole and S-pole, the boundaries of said regions being inclined against a widthwise direction of a magnetic tape, and intensity of magnetization being gradually reduced in the tape running direction, and

one of a non-magnetic part and a feeble magnetic part being alternatively disposed between said first and second magnetic parts.

4,882,560

COIL ARRANGEMENTS IN MAGNETIC RESONANCE APPARATUS

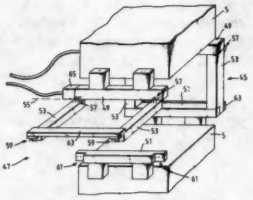
Ian R. Young, West Overton, Nr. Marlborough, and Alasdair S. Hall, Northwood, both of England, assignors to Picker International, Ltd., Wembley, England

Filed Nov. 22, 1988, Ser. No. 274,827

Claims priority, application United Kingdom, Nov. 25, 1987, 8727611

Int. Cl.[4] H01F *5/00*

U.S. Cl. 335—299 **11 Claims**



1. An RF coil arrangement in a magnetic resonance apparatus including a pair of pole pieces which define a gap in which a static magnetic field for application to a body under examination is produced, the RF coil arrangement comprising at least one coil having a first part fixedly secured to a part of the magnetic resonance apparatus adjacent said gap and a further part which is detachably electrically connected with at least a portion of said first part.

4,882,561

ELECTRIC NOISE ABSORBER

Akio Fujioka, Ichikawa, Japan, assignor to Kitagawa Industries Co., Ltd., Japan

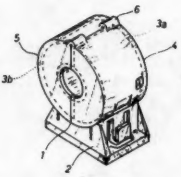
Filed Apr. 28, 1988, Ser. No. 187,515

Claims priority, application Japan, Jul. 13, 1987, 62-108144[U]

The portion of the term of this patent subsequent to Apr. 25, 2006, has been disclaimed.

Int. Cl.[4] H01F *17/06, 27/02, 17/26*

U.S. Cl. 336—65 **15 Claims**



1. An electric noise absorber comprising:

a magnetic abutably divided into at least two portions, said magnetic body configured to receive an electric conductor;

a retaining case including two case pieces, said case pieces being movable with respect to each other between an open state and a closed state, said retaining case including means for holding said magnetic body about and adjacent to an electric conductor when in said closed state to absorb electronic noise;

a case fixing stand; and

a latching mechanism detachably holding said fixing stand to said retaining case, said mechanism having resilient pawl-

type protrusions and means being detachably engaged by said protrusions.

4,882,562

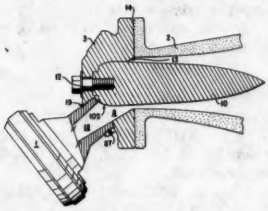
ADAPTOR FOR COUPLING PLURAL COMPRESSION DRIVERS TO A COMMON HORN

Anthony J. Andrews, Capel, and Toby C. Hunt, Rusper, both of England, assignors to Turbosound Limited, England

Continuation of Ser. No. 838,364, Mar. 11, 1986, abandoned. This application Jan. 25, 1988, Ser. No. 147,647

Int. Cl.[4] G08B 3/00

U.S. Cl. 340—388 22 Claims



10. An adaptor for combining the acoustic outputs of a plurality of sound transducers, said adaptor including an adaptor body having means for mounting the transducers thereon and a member projecting forwardly of the adaptor body, the member tapering in the direction away from the adaptor body, the adaptor body including a plurality of acoustically isolated passages each for directing the output of a respective one of said transducers from an inlet to an acoustically common annular region of space surrounding the forwardly projecting member, each of said passages being acoustically separate from a point adjacent said transducers to a point where said passages reach said annular region said inlet having a cross-sectional area, said cross-sectional area of said acoustically common annular region of space including a region of substantially reduced cross-sectional area relative to the sum of said cross-sectional areas of said inlets.

4,882,563

HOOD ORNAMENT THEFT ALARM

Marvin K. Perlman, 234 Morena Blvd., and Richard S. Perlman, 2311 Morena Blvd., both of San Diego, Calif. 92110

Filed Apr. 21, 1989, Ser. No. 341,632

Int. Cl.[4] B60Q 1/00

U.S. Cl. 340—426 7 Claims

1. A hood ornament alarm actuator for a hood ornament attached to a hood with a resilient means extending through a hole in said hood to retain said ornament in place, said actuator comprising;

(a) An upper plug having an axial bore therethrough;

(b) A lower plug having an axial bore therethrough substantially aligned with the axial bore of said upper plug;

(c) Spring means biasing said plugs apart;

(d) Elongated retainer means for engaging said hood ornament and extending down through the hole in the hood, passing through the axial bores in each of said plugs and engaging said lower plug; and

(e) A pair of electrical contacts mounted to said respective plugs and being adapted to connect to wires leading respectively to a vehicle power point (or ground) and a contact on the vehicle horn, such that an attempt to remove the hood ornament raises said retainer means, compressing said plugs towards one another against said spring means, and bringing said contacts into mutual contact to activate the vehicle horn.

4,882,564

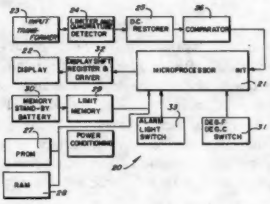
REMOTE TEMPERATURE MONITORING SYSTEM

Paul Monroe, Janesville, Wis., and James Kurth, Hopkins, Minn., assignors to Monitech Corporation, Minn.

Filed Jun. 6, 1988, Ser. No. 202,199

Int. Cl.[4] B60Q 1/00; G01K 11/00

U.S. Cl. 340—449 6 Claims



1. A remote temperature sensor and alarm system for a temperature controlled vehicle comprising:

a. a fixed rate oscillator;

b. means for sensing temperature said sensing means producing a temperature related electrical output;

c. means producing an analog repeating ramp voltage time frame synchronous with said oscillator;

d. a transmitter comparator receiving the output of the temperature sensing means as a first input and the analog ramp voltage as a second input said transmitter comparator producing a low output while the first input exceeds the second input and a high output while the second input exceeds the first input;

e. a programmable divider receiving a first input from the oscillator and a second input from the transmit comparator said programmable divider producing an output of a first frequency while the second input is low and an output of a second frequency while the second input is high;

f. a transmitter receiving the programmable divider output, said transmitter conditioning and transmitting said first and second frequencies;

g. a receiver receiving said first and second frequencies; said receiver conditioning said frequencies for transmission therefrom;

h. a processor unit receiving the said conditioned first and second frequencies from said receiver and decoding from each of the said transmitted time frames a temperature value;

i. a means for displaying said temperature value received from said processor unit.

4,882,565

INFORMATION DISPLAY FOR REARVIEW MIRRORS

William W. Gallmeyer, Holland, Mich., assignor to Donnelly Corporation, Holland, Mich.

Filed Mar. 2, 1988, Ser. No. 163,387

Int. Cl.[4] B60Q 9/00

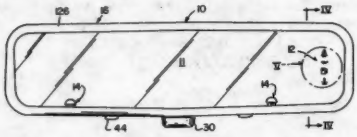
U.S. Cl. 340—461 37 Claims

1. An improved rearview mirror assembly for vehicles of the type including a mirror element having a reflective surface

thereon and information means for providing information to a viewer of the mirror; the improvement comprising:

said information means including a narrow deletion area in said reflective surface in which said reflective surface is removed to form an opening of predetermined shape such as a symbol, word or other indicia in said reflective surface; and

light source means for illuminating said deletion area when lit/activated, said light source means positioned behind said reflective surface on the side of said mirror element opposite that from which said mirror element will be viewed in a vehicle;



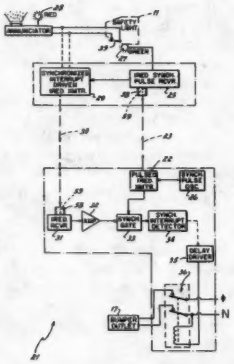
said deletion area including at least one deletion line having a width which is sufficiently narrow to provide minimal contrast between the reflective surface and said line and thus be generally unnoticeable to the unaided eye of the viewer of the mirror element when viewing a rear vision image reflected by said reflective surface and said light source means is unlit/unactivated, but providing highly distinct, clear and precise lighted indicia visible to the mirror viewer when said light source means is lit/activated.

4,882,566

SAFETY CONTROL SYSTEM FOR A HOSPITAL BED

Clement J. Koerber, Sr., Batesville, Ind.; Dennis J. Gallant, Harrison, Ohio, and L. Dale Foster, Brookville, Ind., assignors to Hill-Rom Company, Inc., Batesville, Ind.

Filed Aug. 3, 1988, Ser. No. 227,863
Int. Cl.[4] F21V *33/00, 23/04*
U.S. Cl. 340—825.690 **12 Claims**



1. In a hospital room safety control system for disconnecting electrical power to an electrically operated bed to interrupt vertical movement of the bed upon contact between a bed mounted structure and a safety light mounted to a head wall, said electrical power being supplied to said bed via an outlet below the light, the improvement comprising:

a first transmitter adjacent the outlet and adapted to transmit a first wireless signal to said safety light;

a first receiver mounted at said safety light adapted to receive said first wireless signal;

a second transmitter at said safety light operatively associated with said first receiver and adapted to transmit a second wireless signal upon reception of said first wireless signal;

a second receiver adjacent said outlet and adapted to receive said second wireless signal;

a power control circuit operatively associated with said second receiver and adapted to supply electrical power to said outlet upon reception of said second wireless signal;

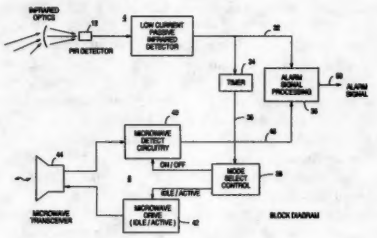
a safety switch at said safety light adapted to detect contact with said light, said safety switch being operatively associated with said second transmitter to disable transmission of said second wireless signal upon detection of said contact, thereby to disconnect electrical power to said outlet when said light is contacted.

4,882,567

INTRUSION DETECTION SYSTEM AND A METHOD THEREFOR

Richard A. Johnson, Pleasanton, Calif., assignor to C & K Systems, Inc., San Jose, Calif.

Filed Sep. 29, 1988, Ser. No. 251,130
Int. Cl.[4] G08B *19/00*
U.S. Cl. 340—522 **11 Claims**



3. An intrusion detection system comprising

a passive detecting means for detecting the presence of an intruder in a volume of space and for generating a first signal in response to the detection of said intruder;

a microwave detecting means having a ready state and an active state, for detecting the presence of said intruder in said volume of space and for generating a second signal in response to the detection of said intruder;

a means for maintaining said second detecting means in said ready state;

a switch means for activating said microwave detecting means by placing said microwave detecting means in said active state in response to said first signal; and

logic means for receiving said first and said second signals and for producing an alarm signal in response thereto, said alarm signal indicative of the detection of the presence of said intruder in said volume of space.

4,882,568

TOILET TISSUE ALERT SYSTEM

Jerry L. Kyser, 4410 Spring Hill, and David D. Mears, 4405 Spring Hill, both of, Inkster, Mich. 48141

Filed May 25, 1988, Ser. No. 198,505
Int. Cl.[4] G08B *13/14*
U.S. Cl. 340—568 **8 Claims**

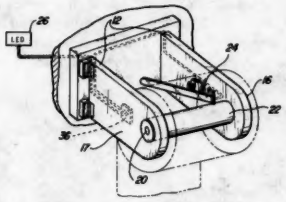
1. A paper roll holding device and alert system comprising:

a bracket having a back member and two side members, each side member having a notch formed therein;

an elongated tissue paper roll retaining member being re-

tained between the notches in each side member of the bracket;

means for detecting the end of a tissue roll, said means connected to one bracket side member and extending the



width of a tissue roll to contact the opposite bracket side member when the tissue roll is depleted; and

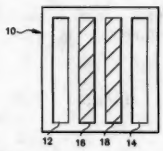
a signalling means indicating the end of the tissue roll, the signalling means being operably connected to the detecting means.

4,882,569

DEACTIVATABLE FEQUENCY-DIVIDING-TRANSPONDER TAG

Subrata Dey, St. Petersburg, Fla., assignor to Security Tag Systems, Inc., St. Petersburg, Fla.

Filed Jul. 26, 1988, Ser. No. 224,326
Int. Cl.[4] G08B *13/26*
U.S. Cl. 340—572 **11 Claims**



1. A tag for attachment to an article to be detected within a surveillance zone, comprising

a frequency-dividing transponder including an active strip of magnetic material that, when magnetically biased to be within a predetermined magnetic field intensity range, responds to excitation by electromagnetic radiation of a first predetermined frequency by radiating electromagnetic radiation of a second predetermined frequency that is a frequency-divided quotient of the first predetermined frequency,

a first bias strip for magnetic material disposed in relation to the active strip of magnetic material for biasing the active strip of magnetic material to be within the predetermined magnetic field intensity range only when the first bias strip of magnetic material is magnetized; and

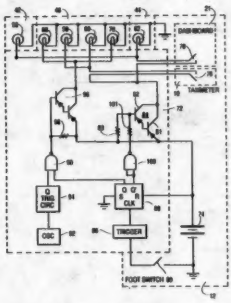
a second bias strip of magnetic material disposed in relation to the active strip of magnetic material for further biasing the active strip to be outside of the predetermined magnetic field intensity range to thereby prevent the active strip of magnetic material from radiating electromagnetic radiation of the second predetermined frequency in response to excitation by electromagnetic radiation of the first predetermined frequency when the first and second bias strip of magnetic material are both magnetized.

4,882,570

VEHICLE AND DISTRESS INDICATOR THEREFOR

Antonio Martinez, Bronx, N.Y., assignor to Argo Instruments Inc., Winchester, Va.

Filed May 25, 1988, Ser. No. 198,460
Int. Cl.[4] G08B *5/38*
U.S. Cl. 340—574 **8 Claims**



1. A distress indicating system for a vehicle having a notification light arrangement including a plurality of normally operating notification lamps, said system comprising:

switch means responsive to a driver's actuation for producing a hazard indication,

circuit means responsive to said switch means for disabling the normally operating notification lamps,

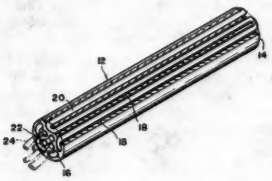
flashing means responsive to said switch means for producing a flash signal.

4,882,571

SENSOR USED FOR ELECTRICAL HEATING MEASUREMENT

Tomoshige Hori, Kitamoto; Yasuhiko Shiinoki, Tokyo, and Kensuke Itoh, Kodaira, all of Japan, assignors to Snow Brand Milk Products Co., Ltd., Japan

Filed Jul. 26, 1988, Ser. No. 224,099
Claims priority, application Japan, Aug. 12, 1987, 62-201628
Int. Cl.[4] H01C *7/00*
U.S. Cl. 338—28 **11 Claims**



1. In a sensor for determining physical properties of a fluid by electrically heating measurements in which an electrical current source and a voltmeter are connected to a plurality of thin metal wires associated with the sensor, the thin metal wires are heated by current from the current source and the voltage in the thin metal wires is measured while heat is transferred from the sensor to the fluid, the improvement comprising a sensor having:

(A) an elongated rod;

(B) a plurality of first holes disposed axially through said rod;

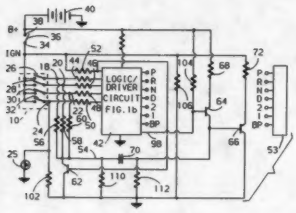
(C) a plurality of thin metal wires disposed through said first holes; and

(D) an electrically insulating member covering the sensor.

4,882,572
ELECTRONIC RANGE INDICATOR FOR A MOTOR VEHICLE

Raymond Lippmann, Ann Arbor, and Michael J. Schnars, Clarkston, both of Mich., assignors to Delco Electronics Corporation, Kokomo, Ind.

Filed Feb. 6, 1989, Ser. No. 306,122
Int. Cl.[4] B60Q *1/00*
U.S. Cl. 340—456 **7 Claims**



1. In a motor vehicle having a selector mechanism adapted to be positioned by a vehicle operator for selecting a desired transmission range, and position detecting means including at least one limit switch having input and output terminals which are electrically connected or disconnected depending on the position of said selector mechanism, apparatus for providing a continuous electronic indication of the selector mechanism position, comprising:

on state means operative during on periods of the vehicle to connect said input terminal to a relatively high potential system voltage which is present only during on periods of the vehicle, while biasing said output terminal toward a lower voltage which is overridden by said high potential system voltage when the limit switch is closed to connect said input and output terminals;

off state means operative during off periods of the vehicle to intermittently connect said input terminal to said lower voltage, while biasing said output terminal toward a higher voltage which is overridden by said lower voltage when the limit switch is closed to connect said input and output terminals, thereby to logically invert the output terminal voltage as compared with that established during on periods of the vehicle;

decoding means for developing output data which identifies the selector mechanism position as a function of said system voltage and the voltage at the output terminal of said limit switch; and

driver means effective (1) during on periods of the vehicle for activating a display device in accordance with the output data continuously generated by said decoder means, and (2) during off periods of the vehicle for activating said display device only in accordance with the output data generated by said decoder means during the intermittent periods of operation of said off state means.

4,882,573
APPARATUS AND METHOD FOR DETECTING THE PRESENCE OF A BURNER FLAME

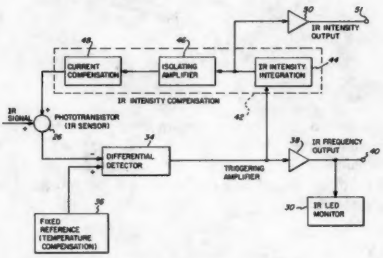
John K. Leonard, Mississauga, and Roland Fabry, Montreal, both of Canada, assignors to Pullman Canada Ltd., St.Thomas, Canada

Filed Mar. 25, 1988, Ser. No. 173,120
Int. Cl.[4] G08B *17/12*
U.S. Cl. 340—578 **33 Claims**

1. A flame detecting device for rendering an indication of the presence or absence of a flame, said device comprising:

(a) means for sensing a first radiation spectrum from said flame, said first spectrum being characterized by a first wavelength range, said first radiation sensing means for producing a first signal that varies according with at least one characteristic of said first spectrum, said characteristic including at least the flicker frequency of said flame;

(b) means for sensing a second radiation spectrum from said flame, said second spectrum being characterized by a second wavelength range, said second radiation sensing means for producing a second signal that varies according with at least one characteristic of said second spectrum, said later characteristic including at least the magnitude of at least one frequency component of said second spectrum;



(c) means for storing information defining standards for said first and second signals in terms of said first and second spectrum characteristics respectively;

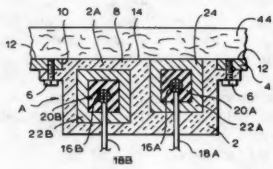
(d) computer means for receiving said first and second signals and comparing said signals to said first and second standards respectively in accordance with at least one program for so comparing with first and second signals and generating an output signal representative of the presence or absence of said flame in accordance with said program; and

(e) output means responsive to said output signal for registering an indication of the presence of absence of said flame.

4,882,574
TWO-RESISTOR ICE DETECTOR

Boris Khurgin, 175 W. 87th St., New York, N.Y. 10024

Filed Jun. 20, 1988, Ser. No. 209,360
Int. Cl.[4] G08B *21/00*
U.S. Cl. 340—581 **15 Claims**



1. An ice detector comprising first and second temperature-sensitive resistors, means for mounting said first resistor in good thermal conductivity with respect to a surface where the presence or absence of ice is to be detected, means for mounting said second resistor in good thermal insulation with respect to said surface, means for simultaneously electrically energizing said resistors, and means for detecting a difference in the resistance of said resistors after they have been energized and activating an indicator in response to a predetermined resistance difference, thereby indicating the presence of ice on said surface.

4,882,575

MONITOR FOR BLOCKED CONDITION IN TUBE FOR FLUID INFUSION PUMP

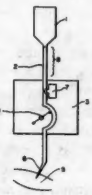
Masafumi Kawahara, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jan. 19, 1988, Ser. No. 145,141

Claims priority, application Japan, Jan. 28, 1987, 62-19054; Jan. 30, 1987, 62-20887; Feb. 4, 1987, 62-23969

Int. Cl.[4] G08B *21/00*

U.S. Cl. 340—608 17 Claims



1. A monitor for a blocked condition in a tube for a fluid infusion pump having a fluid container connected to said tube and head means for operating on said tube to cause a fluid transportation through said tube, said monitor comprising

detector means for detecting selectively at times separated by a constant interval or at times separated by uniformly increasing intervals a condition of said tube between said fluid container and said head means, and

control means for monitoring for a blocked condition in said tube by comparing a most recently outputted value from said detector means selectively with a predetermined constant value or an earlier outputted value from said detector means.

4,882,576

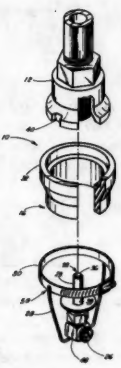
REMOTE COMBUSTIBLE GAS SENSOR

Monty Boyd, Rte. #2, Box 652, Muldrow, Okla. 74948

Continuation-in-part of Ser. No. 934,794, Nov. 25, 1986, abandoned. This application Feb. 9, 1988, Ser. No. 154,101

Int. Cl.[4] G08B *17/10*

U.S. Cl. 340—632 16 Claims



1. A remote combustible gas sensor and calibrator therefor, comprising:

a. a combustible gas sensor;

b. a transmitter housing connected to said combustible gas sensor for transmitting signals indicating a predetermined level of combustible gas; and

c. a calibration means attached to said combustible gas sensor, said calibration means comprising:

i. a main body portion;

ii. means attached to said main body portion for mounting said calibration means on said combustible gas sensor;

iii. means on said main body portion for receiving test gas; and

iv. test gas distribution means mounted on said main body portion, including a flexible bladder attached to said main body portion.

4,882,577

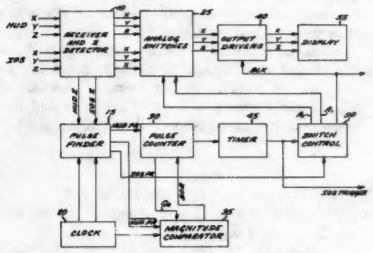
CALLIGRAPHIC CONTROL FOR IMAGE SUPERIMPOSITION

Douglas M. DeVore, Torrance, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Continuation of Ser. No. 745,031, Jun. 7, 1985, abandoned. This application Nov. 25, 1988, Ser. No. 277,425

Int. Cl.[4] G09G *1/10*

U.S. Cl. 340—739 5 Claims



1. A system for superimposing images from two or more calligraphic image sources on a calligraphic monitor, comprising:

a calligraphic monitor comprising a cathode ray tube (CRT), respective X axis and Y axis beam deflection circuitry for respectively deflecting the CRT beam along the X and Y axes in response to analog X and Y deflection signals, and beam intensity control circuitry for controlling the intensity of the CRT beam in response to a beam intensity control signal;

a first calligraphic image source for providing a first set of periodic calligraphic image signals, comprising first analog X and Y deflection signals and a first analog beam intensity control signal, said image source having a first refresh rate of draw cycles, each draw cycle characterized by a first series of write signals, followed by a first temporal interval during which the source is not writing, in turn followed by a second series of write signals, in turn followed by a second temporal interval in which the source is not writing;

a second calligraphic image source for providing a second set of periodic calligraphic image signals comprising second analog X and Y deflection signals and a second analog beam intensity control signal, said second source controlled to provide said signals in response to a trigger signal, said second image source having a second refresh rate of draw cycles;

means for selectively coupling said first set or said second set of image signals to said calligraphic monitor in real time in dependence on a switch control signal, such that said respective first or second analog X and Y deflection signals control said X and Y beam deflection circuitry to directly deflect the CRT beam in accordance with said

deflection signals, and said beam intensity control circuitry is controlled by said respective first or second analog beam intensity control signals so that the intensity of said beam is determined by said beam intensity control signal; and

a calligraphic controller for controlling the operation of said second calligraphic image source, the operation of said first calligraphic image source being independent of control by said controller, comprising:

(i) means for monitoring said first set of calligraphic image signals to determine said first temporal intervals in the periodic cycle of said first set of image signals during which the first image source is not writing to the calligraphic monitor;

(ii) means for locating said second temporal interval in the cycle of said first set of image signals in dependence on the detection of said first temporal interval, said locating means comprising a timer means for providing a trigger signal a predetermined delay after detection of said first temporal location;

(iii) means responsive to said monitoring means and said locating means for generating clock trigger signals for causing said second source to generate said second set of image signals during selected ones of said first and second temporal intervals which are of duration and frequency corresponding to the cycle of the second set of calligraphic image signals; and

(iv) means for generating switch control signals to couple said second set of image signals to said monitor during said selected first and second temporal intervals, and to couple said first set of image signals to said monitor when said first signal is providing image signals.

4,882,578

CHARACTER DISPLAY DEVICE

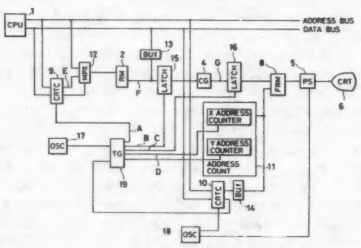
Akihiro Minakuchi, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Mar. 11, 1988, Ser. No. 167,157

Claims priority, application Japan, Mar. 16, 1987, 59075/87

Int. Cl.[4] G09G 1/00

U.S. Cl. 340—750 **7 Claims**



1. A character display device for displaying characters as pixels on a display screen of a display means operating in accordance with a synchronous signal, comprising:

a refresh memory for storing character codes in their respective display positions on the display screen;

a CPU for accessing said refresh memory and for writing character codes in said refresh memory;

first control means for sequentially supplying said refresh memory with addresses for reading the character codes stored therein, thereby causing said refresh memory to sequentially produce the character codes;

switching means for selectively connecting said refresh memory with one of said CPU and said first control means, so that the addresses for said refresh memory are supplied from said first control means during production of character codes by said refresh memory and are supplied from said CPU during writing of the character codes in said refresh memory;

a character generator responsive to said character codes produced by said refresh memory for producing pixel signals representing character patterns of said character codes;

a frame memory responsive to the pixel signals from said character generator for storing the pixel signals at corresponding write addresses for corresponding display positions for each of the respective pixels of said display screen;

second control means for sequentially supplying said frame memory with read addresses, thereby causing said frame memory to sequentially produce pixel signals; said second control means operating in accordance with said synchronous signal for said display means;

an address counter producing write addresses to said frame memory designating the memory locations of said frame memory at which the pixel signals from said character generator should be written; and

means for causing said display means to display the pixel signals produced by said frame memory as pixels on said display screen.

4,882,579

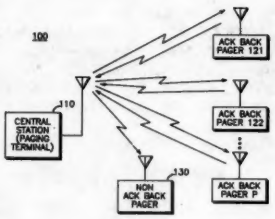
CODE DIVISION MULTIPLEXED ACKNOWLEDGE BACK PAGING SYSTEM

Kazimierz Siwiak, Coral Springs, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 7, 1988, Ser. No. 141,656

Int. Cl.[4] H04Q 9/00

U.S. Cl. 340—825.44 **21 Claims**



1. An acknowledge back pager having a unique address associated therewith, said pager comprising;

receiving means for receiving paging signals from a central station, said paging signals including a batch of M pager addresses transmitted in a sequential order during a first time period, wherein M is the number of pager addresses in said batch;

decoding means, coupled to said receiving means, for detecting the presence of said pager's address within said batch of M addresses;

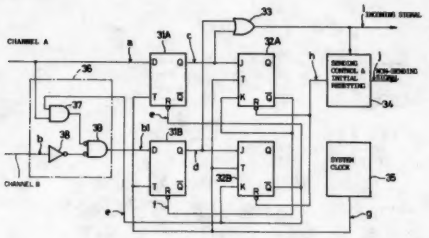
address order determining means, coupled to said decoding means, for determining the order of said pager's address within said batch of M addresses, and

pseudorandom code transmitting means for transmitting an acknowledge back signal at a selected frequency, said acknowledge back signal including a selected one of a plurality of M substantially orthogonal pseudorandom codes, said selected one of said codes exhibiting a predetermined relationship to the order of the address of said pager within said batch of M addresses.

4,882,580
COMMUNICATION SYSTEM

Mitsuji Teranishi, Yao; Yasuo Watanabe, and Akira Takeuchi, both of Ibaragi, all of Japan, assignors to Asics Corporation, Japan

Filed May 6, 1985, Ser. No. 731,147
Claims priority, application Japan, May 9, 1984, 59-93668; May 9, 1984, 59-93669
Int. Cl.[4] H04Q *5/00, 5/22*
U.S. Cl. 340—825.51 **7 Claims**



1. A first arrival preference circuit, provided in an apparatus having a processing device for receiving input signals and transmitting an output signal to other apparatus, said first arrival preference circuit comprising:

two gate circuits connected respectively to each of two input terminals for receiving first and second input signals;

a first arrival discrimination circuit for discriminating which one of the first and second input signals has arrived first to one or the other of said two input terminals and for determining that the first and second input signals have arrived to the two input terminals at the same time;

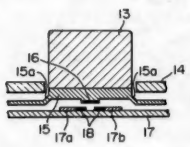
a gate control circuit for causing the gate circuit connected to the input terminal where the first signal has arrived or to a predetermined one of said terminals when the two input signals have arrived at the same time to accept the input signal, and for causing the other gate circuit to be inhibited from accepting the input signal, and

a sending control circuit for producing a non-sending signal while one of the first and second input signals is being accepted, the non-sending signal controlling said processing device to inhibit transmission of said output signal to said other apparatus.

4,882,581
KEYBOARD FOR A PORTABLE DATA TERMINAL

Kazuhiko Inobe, and Masami Kanzaki, both of Yokohama, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Feb. 18, 1988, Ser. No. 159,440
Claims priority, application Japan, Feb. 19, 1987, 62-36064
Int. Cl.[4] H03M *9/00;* **H03K** *17/967*
U.S. Cl. 341—22 **4 Claims**

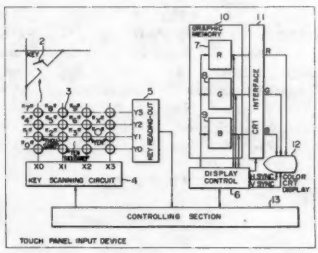


1. A portable terminal keyboard comprising a terminal main unit for collecting and storing data; a substrate having a plurality of pairs of electrical contacts; and a plurality of key tops, each of said plurality of key tops including (a) an upper portion formed of a mixture of silicone rubber and phosphorescent material and arranged to protrude through a case of said main unit, (b) a lower portion which is substantially free of phosphorescent material, and (c) switch means including an electrical contact disposed on said lower portion and operative to come in contact with a respective one of said plurality of pairs of electrical contacts so that said switch means electrically connects the contacted one of said plurality of pairs of electrical contacts in response to depression of the respective key top.

4,882,582
TOUCH PANEL INPUT DEVICE

Minoru Oka, Toyota, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 16, 1987, Ser. No. 120,880
Claims priority, application Japan, Nov. 18, 1986, 61-274426
Int. Cl.[4] G09G *1/00;* **H03K** *17/968*
U.S. Cl. 341—23 **13 Claims**



1. A touch panel input device provided with means for displaying an image including letters and with input keys superposed on the means for displaying and made of a transparent material, in which the image including letters is displayed at a position on the screen of a CRT display corresponding to an arrangement of the input keys, comprising:

means for displaying a part of the image that is displayed at a position corresponding to a subset of the input keys in a manner different from the remaining part of the image corresponding to input keys other than the subset of input keys, said subset of input keys including a number of input keys from which an operator is to make a selection;

wherein the part of the image that is displayed at a position corresponding to the subset of input keys is displayed with greater emphasis, before an operator pushes down one of the keys, than a remaining part of the image corresponding to input keys which are not included in said subset, so that the operator can recognize the part of the image corresponding to the subset of input keys easier than said remaining part of the image.

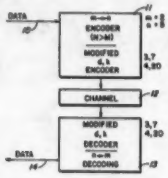
4,882,583
MODIFIED SLIDING BLOCK CODE FOR LIMITING ERROR PROPAGATION

Kamal E. Dimitri, Tucson, Ariz.; Martin A. Hassner, Palo Alto, and Paul H. Siegel, San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 31, 1988, Ser. No. 200,322
Int. Cl.[4] H03M *7/00*
U.S. Cl. 341—59 **6 Claims**

1. A code translation device for transferring data between two differently coded binary representations in respective

codes thereof, being a (d,k) constrained code, a first code being unconstrained, characterized in that the "d" constraint is vio-



lated by a bit inversion adjacent each naturally coded singleton bit of the opposite denomination to reduce error propogation.

4,882,584

TRANSDUCER FOR PROCESS CONTROL

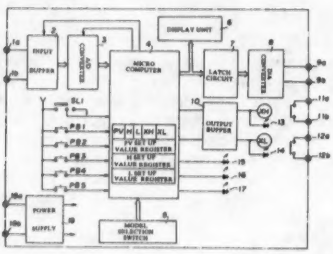
Hideaki Nakamura, Joyo; Tamotsu Shimamori, Nagaokakyo, and Shinichi Murashige, Kyoto, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Sep. 5, 1986, Ser. No. 903,976

Claims priority, application Japan, Sep. 5, 1985, 60-196714; Sep. 27, 1985, 60-215645; Oct. 28, 1985, 60-241808; Oct. 28, 1985, 60-241805

Int. Cl.[4] H03M 1/18

U.S. Cl. 341—139 **16 Claims**



1. A process control transducer, for converting an analog input signal having a range incompatible with a process controller into an analog output signal, compatible with said controller comprising:

(a) means for receiving and buffering said analog input signal;

(b) an A/D converter for converting said buffered signal into a digital signal;

(c) an input device for incrementing and decrementing a value to be adjusted;

(d) an upper limit setting means for setting an upper limit value according to the operation of said input device;

(e) a lower limit setting means for setting a lower limit value according to the operation of said input device;

(f) a comparison means for comparing a current value of said digital signal output by said A/D converter and said set upper limit value and said set lower limit value; and

(g) an output means for producing an output when a comparison executed by said comparison means indicates that a current value of said digital signal output by said A/D converter has exceeded said upper limit value, or has dropped below said lower limit value

4,882,585

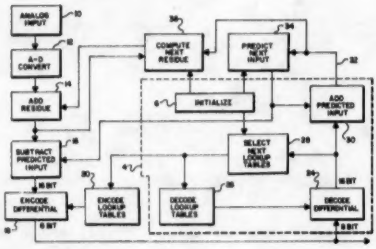
METHOD AND APPARATUS FOR HIGH RESOLUTION ANALOG-DIGITAL-ANALOG TRANSFORMATIONS

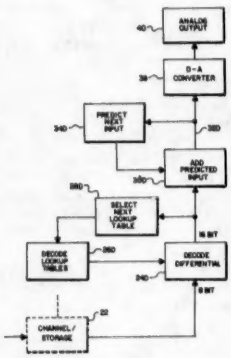
Terry D. Beard, 1407 North View Dr., Westlake Village, Calif. 91362

Filed Mar. 17, 1988, Ser. No. 169,865

Int. Cl.[4] H03M 1/62

U.S. Cl. 341—143 **20 Claims**





1. A method of encoding a series of input digital signals in a higher order digital format to a series of lower order digital signals and then recovering the original input digital signals from the lower order signals, comprising:

generating a predicted value for an input signal in said series,

comparing said predicted value with said input signal to obtain a differential quantity representing the difference between the two,

encoding said differential quantity to a lower order digital format with an encoding transformation,

decoding the encoded differential quantity to said higher order format with a decoding transformation that is complementary to said encoding transformation,

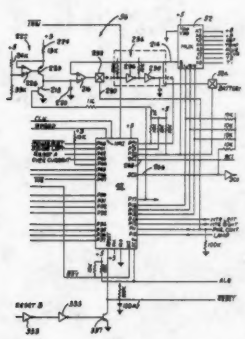
selecting an encoding transformation for the next input signal in the series, the resolution of said encoding transformation being a function of the absolute value of the differential quantity just decoded, and

combining said predicted value with the value of said decoded differential quantity to recover said original input signal.

4,882,586
ANALOG-TO-DIGITAL CONVERTER

Darrel A. Dolph, Big Rapids; Leonard W. Demski, Reed City; Robert E. Taylor, Cadillac, and Jean-Marie Loisel, Big Rapids, all of Mich., assignors to Nartron Corporation, Reed City, Mich.

Division of Ser. No. 620,188, Jun. 13, 1984, Pat. No. 4,621,327. This application Oct. 24, 1986, Ser. No. 922,519
Int. Cl.[4] H03M *1/56*
U.S. Cl. 341—169 **12 Claims**



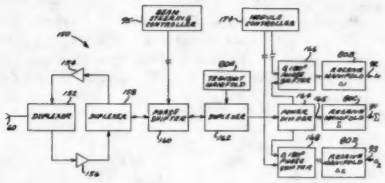
1. An analog to digital converter comprising:
a comparator having two inputs, one input coupled to an analog signal having a magnitude to be converted to a digital signal;
voltage means coupled to a second input of said comparator for producing a time varying voltage at said second input to said comparator to cause a comparator output to change output state when said analog signal and the time varying voltage are the same;
said voltage means comprising a positive constant current source having a current source output coupled to said second input of the comparator, a capacitor coupled between the constant current source output and a ground for producing said time varying voltage by storing charge from the constant current source, and a control switch for initiating the time varying voltage by initiating a charging of the capacitor; and
a microprocessor controller having a microprocessor output coupled to the control switch to initiate the time varying voltage, a microprocessor input for sensing the output from the comparator to determine when the time varying voltage and the analog signal are equal, and a microprocessor timer for determining how long after the control switch initiates said time varying voltage it takes for the microprocessor input to change state indicating that the time varying voltage and analog signal are equal.

4,882,587
ELECTRONICALLY ROLL STABILIZED AND RECONFIGURABLE ACTIVE ARRAY SYSTEM

Samuel N. Vodopia, Santa Monica, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Apr. 29, 1987, Ser. No. 44,638
Int. Cl.[4] H01Q *3/22*
U.S. Cl. 342—372 **19 Claims**

1. An active array system for providing electronically roll stabilized array difference patterns, comprising:
an array of spaced radiative elements forming a radiative aperture for receiving electromagnetic radiation;
a plurality of active modules respectively coupled one each to each radiative element, each module comprising a first means for selectively phase shifting the radiation received at the corresponding radiative element by relative phase shifts of substantially 0 degrees or 180 degrees in dependence on a first module control signal to provide a first module receive signal;
means for combining the respective first module receive signals to provide a first difference channel output signal;
means for providing attitude position signals representing the relative attitude position of the array in relation to a reference position; and

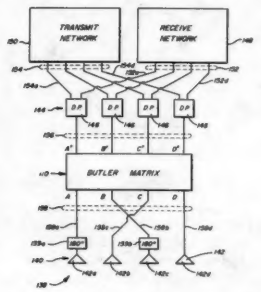


control means responsive to said attitude position signals for providing respective first module control signals to each of said plurality of modules for selectively controlling said first phase shifting means of each module to selectively and independently phase shift the radiation received at each radiative element so as to roll stabilize said first difference channel output signal in relation to said reference position.

4,882,588
STEERABLE BEAM ANTENNA SYSTEM USING BUTLER MATRIX

Kenneth H. Renshaw, Manhattan Beach, and Timothy A. Murphy, Redondo Beach, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Continuation of Ser. No. 944,091, Dec. 22, 1986, abandoned. This application Nov. 14, 1988, Ser. No. 271,401
Int. Cl.[4] H01Q *3/22, 3/24, 3/26*
U.S. Cl. 342—373 **29 Claims**



1. A method of operating a frequency addressable, steerable beam antenna system, comprising the steps of:
(a) providing a set of first signals having a predetermined phase relationship with respect to one another and containing information to be transmitted, each of said first signals having a carrier frequency related to its corresponding phase;
(b) generating a set of second signals from said set of first signals by at least approximately performing a spatial transformation on the amplitude and distribution of said set of first signals, including the step of feeding said first set of signals to the inputs of a Butler matrix such that the phase of the first signals varies from input-to-input of said matrix in a predetermined relationship, said Butler matrix

including a plurality of outputs for delivering said second set of signals, the phase distribution of said second set of signals at said outputs being determined by the predetermined relationship of the phases of said first signals;

(c) feeding said second set of signals from the outputs of said Butler matrix to a plurality of feed elements of an antenna array in a manner such that the phases of the second set of signals vary from feed element to feed element in accordance with said predetermined phase relationship; and

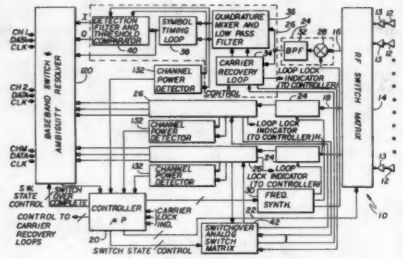
(d) transmitting said set of second signals toward a reflector from said antenna array at a position located near a focal point of the reflector in a manner to from a plurality of beams of electromagnetic radiation where each of said beams is associated with a particular one of said carrier frequencies.

4,882,589

COHERENT SWITCHING SYSTEM FOR A MULTIPLE BEAM ANTENNA

Sam Reisenfeld, Playa del Rey, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 29, 1986, Ser. No. 947,459
Int. Cl.[4] H01Q 3/02
U.S. Cl. 342—374 **6 Claims**



1. A coherent switching system for a multiple beam antenna comprising:

first channel means connected to a first feed of said antenna, said first channel means having a first demodulator for providing a first baseband signal;

second channel means connected to a second feed of said antenna, said second channel means having a second demodulator for providing a second baseband signal;

power detection means for measuring the power of said first baseband signal;

coherent switching means responsive to said power detection means for switching from said first demodulator to said second demodulator in order to provide switching at baseband from said first baseband signal provided by said first channel to said second baseband signal provided by said second channel; and

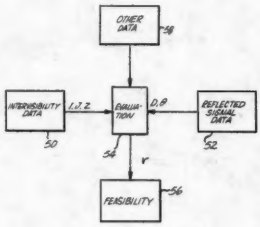
linear predictive filter means for activating said switching means, said filter means communicatingly connected to said power detector for determining a time at which the switching will occur based on input from said power detector.

4,882,590

METHOD FOR LOCATING A RADIO FREQUENCY EMITTER

Ronald E. Huss, Los Angeles, Calif., and Ellis S. Feldman, Arlington, Va., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed May 18, 1988, Ser. No. 195,740
Int. Cl.[4] G01S 3/02
U.S. Cl. 342—453 **4 Claims**



1. A method for locating a radio frequency emitter that transmits pulses in a swept beam pattern comprising the steps of:

storing intervisibility data of terrain points in a region around an observation point;

measuring at the observation point the times of arrival of a plurality of terrain point reflections of a single pulse transmitted by the emitter;

repeating the measuring step for a plurality of pulses transmitted by the emitter; and

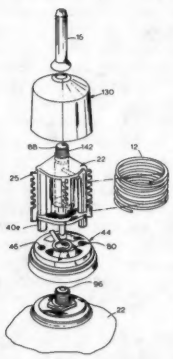
comparing terrain points of reflection calculated from the measured times of arrival for assumed emitter locations with the stored intervisibility data of terrain points.

4,882,591

BASE LOADED ANTENNA

Richard W. Galvin, Riverside, Calif., and James W. Wilson, Las Vegas, Nev., assignors to Wilson Antenna Inc., Henderson, Nev.

Filed Oct. 3, 1988, Ser. No. 252,752
Int. Cl.[4] H01Q 1/12, 1/32
U.S. Cl. 343—715 **5 Claims**



5. In a base loaded antenna which includes a coil having a plurality of turns of electrically conductive wire and having upper and lower coil ends, conductors connected to said upper and lower coil ends, and a dielectric frame which includes a

coil support and a cover lying about the coil support and coil, the improvement wherein:

said coil support has upper and lower ends and includes a core and a plurality of fins radiating from said core, each fin engaging said wire turns and holding them at predetermined spacings from one another, said fins extending a short enough distance along the circumference of said wire turns to leave most of the circumferential length of the coil unsupported by said fins;

said frame includes a base coupled to said lower ends of said coil support and cover; and including

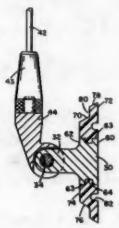
means coupled to said upper ends of said coil support and said cover, for pulling up said upper end of said coil support to load said coil support in tension, and for pressing down on said upper end of said cover to load it in compression.

4,882,592

MOTOR VEHICLE ANTENNA MOUNT

S. Nicholas Studer, Jr., Manalapan, and Kevin J. Connolly, Freehold, both of N.J., assignors to Radio Frequency Systems, Inc., Marlboro, N.J.

Filed Feb. 3, 1989, Ser. No. 306,521
Int. Cl.[4] H01Q *1/32*
U.S. Cl. 343—715 19 Claims



1. Apparatus for communicating signals through a motor vehicle window comprising:

(a) a base including:

(i) a metal foot having an exposed antenna support portion for supporting an antenna in a signal receiving or transmitting orientation and an additional portion having a base surface conforming generally to a surface contour of an outer surface of the motor vehicle window; said additional portion also defining an outer periphery having a groove extending around at least a portion of said outer periphery;

(ii) a non-metallic shield engaging the outer periphery of the metal foot and extending into the groove to engage and adhere to said metal foot, said shield having a window conforming surface generally co-planar with the base surface of the metal foot;

(b) an adhesive material having one adhesive surface dimensioned to engage both the base surface of said foot and the window conforming surface of the shield and having a second adhesive surface to engage the motor vehicle window to affix the shield and metal foot to the window; and

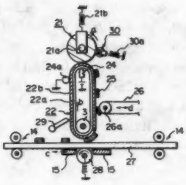
(c) an elongated communications antenna coupled to a swivel base that adjustably engages the antenna support portion of the metal foot to allow the antenna to be re-oriented.

4,882,593

METHOD AND APPARATUS FOR CARRYING OUT TRANSFERENCE RECORDING OF AN INK IMAGE

Kouichi Touma, Kawasaki; Tetsuo Hasegawa, Tokyo; Naoki Kushida, Yokohama; Hisao Yaegashi; Yasuyuki Tamura, both of Yokohama, and Shuzo Kaneko, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 22, 1986, Ser. No. 942,810
Claims priority, application Japan, Dec. 23, 1985, 60-287840; Dec. 23, 1985, 60-287841
Int. Cl.[4] G01D *15/10*; B41J *3/20*
U.S. Cl. 346—111 22 Claims



1. A method of recording an image on a recording medium by image transference comprising the steps of:

fusing or softening supercoolable heat-transferable ink,

selectively transferring the thus fused or softened supercoolable heat-transferable ink onto an intermediate transferring medium in accordance with image information to achieve a first transferring step,

transferring under pressure onto the recording medium the supercoolable heat-transferable ink which had been transferred onto the intermediate transferring medium to achieve a second transferring step, and

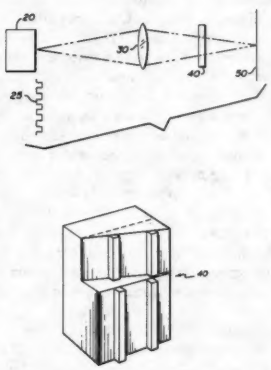
flattening the surface of the remaining supercoolable heat-transferable ink after completion of said first transferring step.

4,882,594

METHOD FOR MAKING A SMOOTH, UNIFORM IMAGE OF A LASER DIODE ARRAY

William T. Plummer, Concord, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Oct. 3, 1988, Ser. No. 252,658
Int. Cl.[4] G01D *15/14*; G02B *5/30*; G11B *7/00*
U.S. Cl. 346—108 9 Claims



1. Phase array apparatus for use with a lens system to provide a substantially smooth, uniform image of a laser array

comprised of a multiplicity of lasers wherein the phase of the radiation emitted by the lasers alternates by an amount which is substantially equal to 180°, said phase array comprising:

phase means, disposed substantially at a far-field image of the laser array formed by the lens system, which far-field image comprises two prominent lobes, for changing the phase of the radiation in said two prominent lobes by an amount which is substantially equal to an odd multiple of 90° with respect to the phase of the remaining radiation in the far-field image in order to convert the final near-field image of the laser array substantially into an oscillatory wave pattern; and

shifting means, disposed near a far-field image but not at a near-field image, for shifting one half of the phase shifted far-field image with respect to the other half to form a pair of near-field images which are shifted with respect to each other by an amount which is substantially equal to an odd multiple of one-half cycle of the oscillatory wave pattern, whereby a substantially smooth, uniform final image of the laser array is formed.

4,882,595

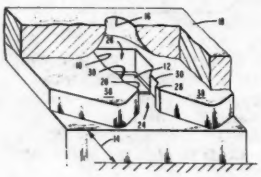
HYDRAULICALLY TUNED CHANNEL ARCHITECTURE

Kenneth E. Trueba; William R. Knight, and Niels J. Nielsen, all of Corvallis, Oreg., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Continuation-in-part of Ser. No. 115,498, Oct. 30, 1987, abandoned. This application Jan. 25, 1989, Ser. No. 303,378

Int. Cl.[4] G01D *15/16*; B41J *3/04*

U.S. Cl. 346—140 R **16 Claims**



1. An improved ink-jet printhead including a plurality of ink-propelling elements (12), each ink-propelling element disposed in a separate firing chamber (26) defined by three barrier walls (36) and a fourth side open to a reservoir of ink common to at least some of said elements, and a plurality of nozzles (16) comprising orifices disposed in a cover plate above said elements, each orifice associated with an element for firing a quantity of ink (A) normal to the plane defined by each said element and through said orifices toward a print medium in defined patterns to form alphanumeric characters and graphics thereon, wherein ink is supplied to said element from a plenum chamber (14) by means of an ink feed channel (10), wherein the improvement comprises:

(a) a pair of opposed projections (28) formed in walls in said ink feed channel and separated by a first width (W_1) to cause a first constriction between said plenum and said channel; and

(b) a second constriction (30) along the length of said ink feed channel defined by a second width (W_2) between said walls of said ink feed channel, said second width narrow than the width of said firing chamber and wider than said first width between said opposed projections and sufficient to physically support said projections without adversely adding to resistance to ink refill of said channel.

4,882,596

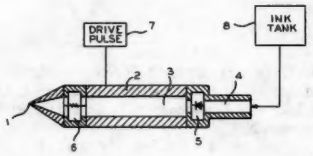
ON DEMAND TYPE INK-JET PRINT HEAD HAVING FLUID CONTROL MEANS

Mitsuo Tsuzuki, and Michihisa Suga, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Continuation of Ser. No. 133,193, Dec. 15, 1987, abandoned, which is a continuation of Ser. No. 928,624, Nov. 4, 1986, abandoned, which is a continuation of Ser. No. 827,471, Feb. 5, 1986, abandoned, which is a continuation of Ser. No. 646,377, Aug. 29, 1984, abandoned. This application Sep. 2, 1988, Ser. No. 243,227

Int. Cl.[4] G01D *15/16*; B41J *3/04*

U.S. Cl. 346—140 R **9 Claims**



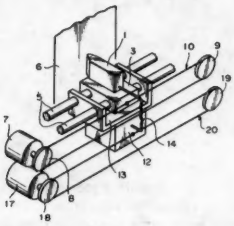
1. An on-demand ink-jet printing head comprising an ink supply coupled to z nozzle via an ink delivery path; said delivery path comprising in series an inlet from said ink supply, fluid rectifier means for enabling substantially a one-way flow of ink in said deliver path, said one way flow being in a direction from said supply toward said nozzle, transducer means, a pressure chamber controlled by said transducer means, said rectifier means comprising a check valve for passing ink from said ink supply through said inlet to said pressure chamber while blocking the flow of the ink from said pressure chamber through said inlet, bi-directional fluid resistance means comprising a wall member having a plurality of pinholes therein through which said ink must flow between said pressure chamber and said nozzle for impeding the free flow of said ink by substantially the same impedance in both a forward and a reverse direction of ink flow, a passageway leading to said nozzle; means for applying drive pulses to said transducer means for selectively pressurizing said chamber to eject an ink droplet from said nozzle, said pressure chamber having a normal volume when no drive pulse is applied thereto, said drive pulse applying means comprising a pulse generator for forming pulses having a high initial voltage level relative to a reference level in order to increase droplet velocity by squeezing said chamber to less than said normal volume for acceleration an ink droplet to a given velocity, said pulse thereafter dropping to an intermediate voltage level which is lower than said high level and higher than said reference level in order to reduce chamber pressure without decreasing droplet velocity, said intermediate level thereafter dropping to a low voltage level which is below said reference level in order to increase the volume of said pressure chamber to larger than a normal chamber volume, and said drive pulse terminating by returning from said low voltage level said reference lever in order to return the volume of said pressure chamber.

4,882,597

LIQUID JET RECORDING APPARATUS HAVING SEPARATE MOTORS FOR DRIVING A LIQUID HEAD AND A LIQUID RESERVOIR

Hiroshi Sugiyama, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 233,955, Aug. 15, 1988, abandoned, which is a continuation of Ser. No. 26,177, Mar. 16, 1987, abandoned. This application Feb. 1, 1989, Ser. No. 304,897
Claims priority, application Japan, Mar. 20, 1986, 61-60861
Int. Cl.[4] G01D *15/16*; B41J *3/04*
U.S. Cl. 346—140 R 20 Claims



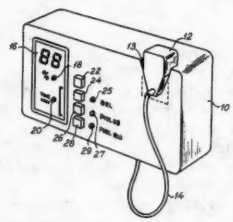
1. A liquid jet recording apparatus comprising:
a recording head for discharging a liquid;
first moving means for moving said recording head along a recording medium;
storing means for storing the liquid to be supplied to said recording head; and
second moving means for moving said storing means independently from said first moving means in the same direction in which said first moving means moves said recording head.

4,882,598

METHOD AND AN APPARATUS FOR DETERMINING AN INDIVIDUAL'S ABILITY TO STAND EXPOSURE TO ULTRAVIOLET RADIATION

Hans C. Wulf, Charlottenlund, Denmark, assignor to Chromo-Light ApS, Charlottenlund, Denmark

PCT No. PCT/DK86/00108, § 371 Date Jul. 24, 1987, § 102(e) Date Jul. 24, 1987, PCT Pub. No. WO87/01948, PCT Pub. Date Apr. 9, 1987
PCT Filed Sep. 26, 1986, Ser. No. 80,886
Claims priority, application Denmark, Sep. 26, 1985, 4370/85; Oct. 24, 1985, 4894/85
Int. Cl.[4] G01J *1/00, 1/42*
U.S. Cl. 250—338.1 73 Claims



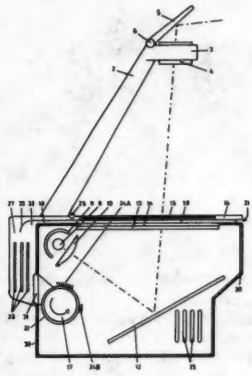
1. A method of determining an individual's ability to stand exposure to ultraviolet radiation without causing a skin reaction, such as skin cancer or erythema, comprising the following steps:
exposing at least part of said individual's skin surface to electromagnetic radiation of a predetermined spectral composition and of a predetermined intensity,
measuring the intensity of electromagnetic radiation reflected from said part of said individual's skin surface so as to determine the coefficient of reflection of said part to said electromagnetic radiation of said predetermined spectral composition, and
converting said coefficient of reflection into a measure representing said individual's ability to stand exposure to ultraviolet radiation without causing said skin reaction.

4,882,599

OVERHEAD PROJECTOR

Peter-Hein Grunwald, Schlatt 215, FL 9491 Ruggell, Liechtenstein

Filed Mar. 29, 1988, Ser. No. 174,842
Claims priority, application Fed. Rep. of Germany, Mar. 31, 1987, 3710628
Int. Cl.[4] G03B *21/00*
U.S. Cl. 353—60 15 Claims



1. An overhead projector comprising:
a housing having side walls, a bottom and a top comprising a Fresnel lens and a transparent writing plate overlying said Fresnel lens,
a light source in said housing and means in said housing for directing light from said light source up through said Fresnel lens and writing plate,
a support arm projecting up from one side of said housing and having an upper end overlying said writing plate,
an objective lens and deflection mirror mounted on said upper end of said support arm for projecting light from said writing plate onto a wall or screen,
a liquid crystal indicating device overlying said writing plate and comprising a frame, two transparent plates set in said frame with a space between them and provided on inner surfaces with electrodes and liquid crystals sandwiched between said plates, said liquid crystal lighting device being spaced over said writing plate to provide between said writing plate and said liquid crystal indicating device on air flow space having an air inlet at one side of said liquid crystal indicating device and an air outlet at an opposite side of said liquid crystal indicating device,
ventilation means in said housing for producing air flow over said light source and light directing means to cool them, said ventilator means also producing air flow through said air flow space between said writing plate and said liquid crystal indicating device from said air inlet to said air outlet to cool said liquid crystal indicating device, and
a housing for electronic elements, said electronic element

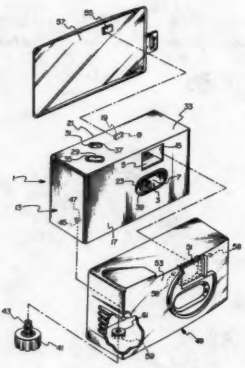
housing being L-shaped with an upper portion on top of said projector housing and a rear part at the rear of said projector housing, said liquid crystal indicating device being connected by a hinge joint with said upper part of said electronic element housing.

4,882,600

UNDERWATER DISPOSABLE SINGLE-USE CAMERA

Alan V. Van de Moere, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 7, 1989, Ser. No. 334,403
Int. Cl.[4] G03B *17/08*
U.S. Cl. 354—64 **5 Claims**



1. An improved disposable single-use camera wherein (a) a plastic inner camera shell is pre-loaded with film and has a front viewfinder opening arranged in a front wall of said inner shell and a rear viewfinder opening arranged in a rear wall of the inner shell for viewing a subject to be photographed through said front and rear viewfinder openings and (b) a paper outer pack contains the inner shell and has a front opening arranged in a front wall of said outer pack and a rear opening arranged in a rear wall of the outer pack to be substantially aligned with the respective viewfinder openings in said inner shell, and wherein the improvement comprises:

a plastic transparent waterproof casing enclosing said outer pack and said inner shell, said transparent casing including a front plastic viewfinder lens element arranged on a front wall of the casing to be optically aligned with said front opening in the outer pack and said front viewfinder opening in the inner shell and a rear plastic viewfinder lens element arranged on a rear wall of said casing to be optically aligned with said rear opening in the outer pack and said rear viewfinder opening in the inner shell.

4,882,601

CAMERA WITH AN AUTOMATIC FOCUSING DEVICE

Nishinomiya Taniguchi, Nishinomiya; Tokuji Ishida, Daito; Toshio Norita, Sakai; Masataka Hamada, Minamikawachi, and Toshihiko Karasaki, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 50,944, May 15, 1987, abandoned. This application Dec. 21, 1987, Ser. No. 136,811
Claims priority, application Japan, May 16, 1986, 61-113315
Int. Cl.[4] G03B *3/10*
U.S. Cl. 354—407 **12 Claims**

1. A camera with an automatic focusing device comprising:

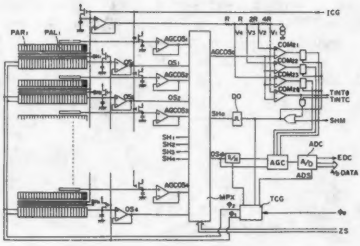
an objective lens mounted on a camera;

means for dividing an image formed by said objective lens into a plurality of zones;

means for obtaining a brightness distribution in each zone;

first means for detecting a rough defocus amount in each zone based on said brightness distribution of said zone so as to produce a plurality of rough defocus amount data;

means for selecting one zone based on the rough defocus amount data of the plurality of zones;



second means for detecting a precise defocus amount in a zone selected by said selecting means based on the brightness distribution contained in said selected zone, so as to produce a precise defocus amount data; and

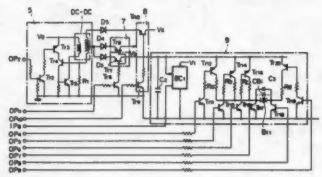
means for driving said objective lens to an infocus condition based on said precise defocus amount data obtained from said selected zone.

4,882,602

PHOTOGRAPHIC CAMERA HAVING A PIEZO-ELECTRIC ACTUATING ELEMENT

Yoshihiro Tanaka; Sadafusa Tsuji, both of Osaka; Yoshiaki Hata, Nishinomiya; Manabu Inoue, Kobe; Hiroshi Ootsuka, Sakai; Michihiro Iwata, Sakai; Fumiaki Ishito, Sakai, and Koh Hayama, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaki, Japan

Division of Ser. No. 13,561, Feb. 11, 1987, abandoned. This application Jun. 8, 1988, Ser. No. 203,937
Claims priority, application Japan, Feb. 12, 1986, 61-29399
Int. Cl.[4] G03B *3/00*
U.S. Cl. 354—457 **4 Claims**



1. A camera, comprising:

a power source;

boosting means for boosting a voltage of said power source;

charging means for accumulating therein energy boosted by said boosting means;

piezo-electric means;

driven means including a shutter connected to be actuated by said piezo-electric means;

driving and controlling means for driving and controlling said piezo-electric means by energy accumulated in said charging means; and

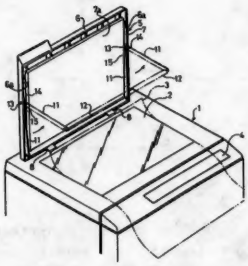
shutter opening speed controlling means having means for controlling a rate of current flow to be supplied to said piezo-electric means per unit time to control the actuating speed of said piezo-electric means and hence the opening speed of said shutter.

4,882,603

ORIGINAL DOCUMENT COVER DEVICE

Toshio Sakata, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 5, 1988, Ser. No. 190,675
Claims priority, application Japan, May 14, 1987, 62-72024[U]
Int. Cl.[4] G03B *27/62*
U.S. Cl. 355—75 6 Claims



1. In an original document cover device for use in a copying apparatus which comprises:

(1) an original document platen defining a document placement region for placing an original document thereon, said document placement region having a perimenter;

(2) an original document cover which is to be opened and closed in relation to the document placement region of said original document platen;

(3) a pressing member rotatably movable over the original document against said original document platen for pressing the original document against said original document platen;

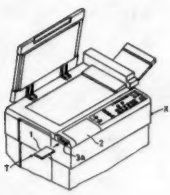
(4) a support member which is pivotably mounted on said original document cover and supporting said pressing member so as to move said pressing member from said document placement region to a region outside said perimeter of said document placement region during closing of said original document cover.

4,882,604

ELECTRONIC MACHINE HAVING TIME MEASURING FUNCTION

Akio Kato; Hiroaki Hamano, and Hideo Ito, all of Azuchi, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Aug. 11, 1988, Ser. No. 230,886
Claims priority, application Japan, Aug. 12, 1987, 62-202194
Int. Cl.[4] G03G *15/00*
U.S. Cl. 355—201 15 Claims



1. An electronic machine having a main body and an auxiliary device removably attachable to the main body, comprising:

timepiece means disposed in said auxiliary device and including a timer for supplying current time information to said main body when mounted in said main body; and

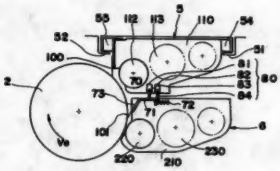
control means for controlling said main body in response to said current time information.

4,882,605

ELECTROPHOTOGRAPHIC COPYING MACHINE

Masashi Sakamoto, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Sep. 26, 1988, Ser. No. 249,336
Claims priority, application Japan, Sep. 25, 1987, 62-240337
Int. Cl.[4] G03G *15/06*
U.S. Cl. 355—215 4 Claims



1. An electrophotographic copying machine which comprises:

rotatable photoreceptor;

developing means including a first removable unit and a second unit provided at downstream of said first removable unit with respect to the rotation of said photoreceptor;

first seal member arranged at said first unit for preventing toner from scattering;

second seal member which is arranged at said second unit for preventing toner from scattering and is movable to contact with said photoreceptor;

first moving means for moving said second seal member from a first state to be out of contact with the photoreceptor to a second state to be in contact therewith upon the removal of said first unit; and

second moving means for moving the second seal member from said second state to said first state upon the attachment of the first unit.

4,882,606

DEVICE FOR GUIDING PAPER TOWARD TRANSFER REGION

Hiroyuki Deguchi, Osaka, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan

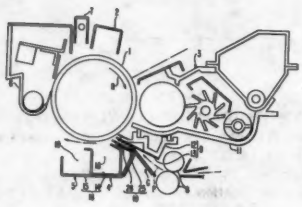
Filed Jul. 19, 1988, Ser. No. 221,419
Claims priority, application Japan, Jul. 21, 1987, 62-184306
Int. Cl.[4] G03G *15/14, 15/16*
U.S. Cl. 355—274 9 Claims

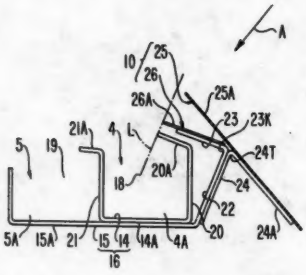
1. A device for guiding paper toward a paper transfer region and a sensitive member, said device comprising:

an upper paper guide to be disposed adjacent the sensitive member;

a lower paper guide to be disposed below the upper paper guide, said lower paper guide comprising at least two elastic members, each said elastic member having a predetermined modulus of elasticity such that said lower paper guide adapts its overall elasticity according to the rigidity

of a paper transferred toward said transfer member, and at least portions of said elastic members contacting the paper





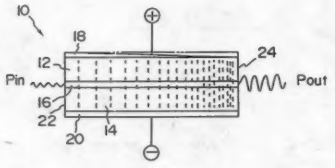
when the paper is transferred having the properties of an electrical insulator.

4,882,607

OPTICAL SEMICONDUCTOR DEVICE

Hidetoshi Shinada, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 28, 1988, Ser. No. 263,857
Claims priority, application Japan, Oct. 28, 1987, 62-272714
Int. Cl.[4] H01L *31/12*
U.S. Cl. 357—19 **12 Claims**



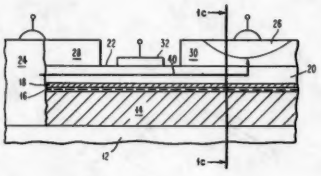
1. An optical semiconductor device comprising a pair of semiconductor regions with electrodes provided on major surfaces of said semiconductor regions, and an active region having incident end and emission end faces and formed between said semiconductor regions, said optical semiconductor device amplifying light by increasing the photon density with carriers injected in said active region in response to the density of an electric current flowing through the region between said electrodes, wherein the injected carrier density distribution is continuously changed over the area between the light incident side and the light emission side.

4,882,608

MULTILAYER SEMICONDUCTOR DEVICE HAVING MULTIPLE PATHS OF CURRENT FLOW

Theoren P. Smith, III, Yorktown Heights, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 12,575, Feb. 9, 1987, Pat. No. 4,812,886. This application Jul. 7, 1988, Ser. No. 216,590
Int. Cl.[4] H01L *29/80*
U.S. Cl. 357—22 **29 Claims**



1. A multilayer semiconductor structure comprising:

a plurality of superimposed layers of semiconductor material disposed on a substrate essentially parallel to an exposed surface, at least two of said layers being conducting layers containing charge carriers, each of said at least two conducting layers being separated by a barrier region;

a first contact extending from said exposed surface through said plurality of layers to electrically contact each of said at least two conducting layers, a second contact separated from said first contact and extending from said exposed surface to electrically contact an uppermost of said at least two conducting layers, each of said at least two conducting layers defining an independent channel of current flow thereby providing at least two independent current paths between said first and second contacts; and

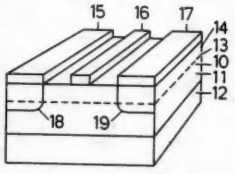
a carrier depletion control means disposed on said exposed surface between said first and second contacts and operable to selectively deplete charge carriers in the said at least two conducting layers sequentially.

4,882,609

SEMICONDUCTOR DEVICES WITH AT LEAST ONE MONOATOMIC LAYER OF DOPING ATOMS

Erdmann Schubert; Klaus Ploog, both of Stuttgart; Albrecht Fischer, Löchgau, all of Fed. Rep. of Germany, and Yoshiji Horikoshi, Tokyo, Japan, assignors to Max-Planck Gesellschaft zur Forderung der Wissenschafter e.V., Gottingen, Fed. Rep. of Germany

Filed Nov. 14, 1985, Ser. No. 798,053
Claims priority, application European Pat. Off., Nov. 19, 1984, 84113987.6
Int. Cl.[4] H01L *29/80, 29/225, 45/00*
U.S. Cl. 357—22 **4 Claims**



1. A field effect transistor formed of compositional epitaxial material grown in layers on a planar substrate, comprising:

a first layer of a semiconductor material of a first composition, having a first bandgap, said first layer being substan-

tially thickner than a monoatomic layer of the same material and being substantially undoped;

a second layer of a semiconductor material of a second composition having a second bandgap smaller than the first bandgap of the semiconductor material of the first composition, said second layer being substantially thicker than a monoatomic layer of the same material and being substantially undoped;

spaced apart source and drain regions extending through said second layer into said first layer;

a conductive channel extending between said source and drain regions; and

a gate region, disposed between said source and drain regions, overlying said conductive channel;

wherein said conductive channel is formed by at least one monoatomic layer of dopant material of only one conductivity type disposed in said first layer having the first bandgap, and having a doping atom concentration in the range from 10^{11} to 10^{14} cm^{-2}, whereby only some atomic positions of said atomic layer are occupied by doping atoms, and wherein said at least one monoatomic layer interconnects said source and drain regions and lies in a plane parallel to said planar substrate.

4,882,610

PROTECTIVE ARRANGEMENT FOR MOS CIRCUITS

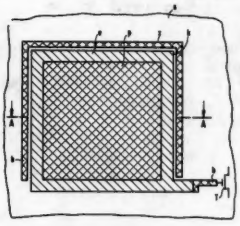
Ulrich Theus, Gundelfingen, and Burkhard Giebel, Denzlingen, both of Fed. Rep. of Germany, assignors to Deutsche ITT Industries GmbH, Freiburg, Fed. Rep. of Germany

Filed Oct. 6, 1988, Ser. No. 254,071

Claims priority, application European Pat. Off., Oct. 29, 1987, 87115862; Mar. 29, 1988, 87105063

Int. Cl.[4] H01L *29/78*

U.S. Cl. 357—23.13 **6 Claims**



1. An improvement in a protective arrangement for an insulated-gate field-effect transistor integrated circuit (MOS circuit) which lies between a pad (p) on an insulating layer (i) covering the substrate (s) of the MOS circuit and a transistor to be protected including a resistor of the opposite conductivity type which is incorporated in the substrate (s), said resistor connecting the pad to a terminal of the transistor:

wherein the resistor is comprised of a doped region (e) in said substrate (s) whose areal form is similar to that of the pad (p) and whose area supporting the pad, which is generally the central area of the region (e) and to which central area low-resistance contact is made via the pad, is greater than the pad area, and

wherein the edge of the region (e) is accompanied, at least in part, by an elongate region (z, z1, z2) of minimum width spaced a minimum distance from said region (e), which:

(1) is of the same conductivity type and has the same resistivity as the region (e); and

(2) is contacted at its surface by means of an interconnection track (b) connected to circuit ground, the connection between the surface and the interconnection track (b) having low resistance.

4,882,611

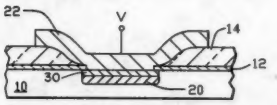
DOUBLE LAYER VOLTAGE-PROGRAMMABLE DEVICE AND METHOD OF MANUFACTURING SAME

Ilan A. Blech, Sunnyvale; Levy Gerzberg, Pala Alto, all of Calif.; Yosef Y. Shacham, Haifa, Israel; Alexander Sinar, Cupertino, and Eric R. Sirkin, Palo Alto, both of Calif., assignors to Zoran Corporation, Santa Clara, Calif.

Filed Jul. 21, 1988, Ser. No. 222,653

Int. Cl.[4] H01L *45/00, 27/02, 29/34*

U.S. Cl. 357—51 **6 Claims**



1. A non-erasable voltage-programmable semiconductor device comprising

a semiconductor material having a doped region therein of one conductivity type,

an amorphized layer of said one conductivity type in said doped region abutting a surface, and

a surface layer on said amorphized layer, said surface layer having a resistivity higher than the resistivity of said amorphized layer prior to programming of said device and a permanently lower resistivity after programming.

4,882,612

POWER SEMICONDUCTOR DEVICE

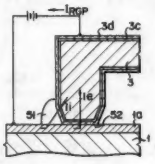
Yasunori Usui, Yokohama; Hiroshi Okamura, Kawasaki; Yoshinari Uetake, Sagamihara, and Takashi Fujiwara, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 4, 1987, Ser. No. 45,468

Claims priority, application Japan, May 17, 1986, 61-111808

Int. Cl.[4] H01L *23/42*

U.S. Cl. 357—79 **6 Claims**



6. A power semiconductor device according to claim 1, wherein the foil member is constructed such that it can be fitted around the control electrode.

4,882,613

METHOD OF AND APPARATUS FOR MOTION VECTOR COMPENSATION IN RECEIVING TELEVISION SIGNAL BASED ON MUSE SYSTEM

Takahiko Masumoto, Toyonaka, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Oct. 19, 1988, Ser. No. 259,812

Claims priority, application Japan, Oct. 20, 1987, 62-264147

Int. Cl.[4] H04N *9/64*

U.S. Cl. 358—37 **19 Claims**

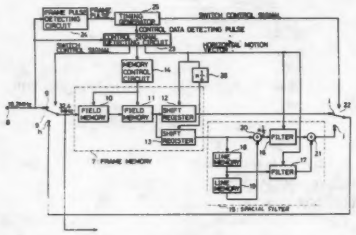
11. An apparatus for horizontal motion vector compensation which carries out compensation for a chrominance signal included in a received television signal based on an MUSE system and time-compressed at a predetermined compression

rate in response to a horizontal motion vector multiplexed on said television signal, comprising:

horizontal motion vector detecting means (23) for detecting a horizontal motion vector signal indicating the amount of a horizontal motion vector from said television signal,

interframe interpolating means (7) for carrying out interframe interpolation using a time compressed chrominance signal in the present frame and a time compressed chrominance signal in any of the previous frames,

delay amount outputting means (26) responsive to an output of said horizontal motion vector detecting means (23) for outputting a value obtained by dividing said amount of the horizontal motion vector by the reciprocal of said compression predetermined rate as the amount of delay,



delay providing means (13; 602) responsive to an output of said delay amount outputting means (26) for providing delay to said time compressed chrominance signal in any of the previous frames in said interframe interpolating means (7), and

filter means (15; 603) for compensating for said time compressed chrominance signal in any of the previous frames in said interframe interpolating means (7) in accordance with predetermined processing corresponding to the remainder obtained by dividing said amount of the horizontal motion vector by the reciprocal of said predetermined compression rate when the remainder is not 0.

4,882,614

MULTIPLEX SIGNAL PROCESSING APPARATUS

Sadashi Kageyama, Hirakata; Yoshio Abe, Ibaraki; Yoshio Yasumoto, Nara; Shuji Inoue, Neyagewa; Hitoshi Takai, Hirakata; Mitsujiro Matsumoto, Shijyonawate; Kouji Aono, Saijyo; Kiyoshi Uchimura, Hirakata, and Eiji Iwasaki, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 7, 1987, Ser. No. 70,804

Int. Cl.[4] H04N *7/08, 11/12*

U.S. Cl. 358—12 **33 Claims**

1. A multiplex signal processing apparatus in a television signal transmitting system, comprising:

a main signal generating means for generating a television signal as a main signal;

a multiplex signal generating means for generating a multiplex signal;

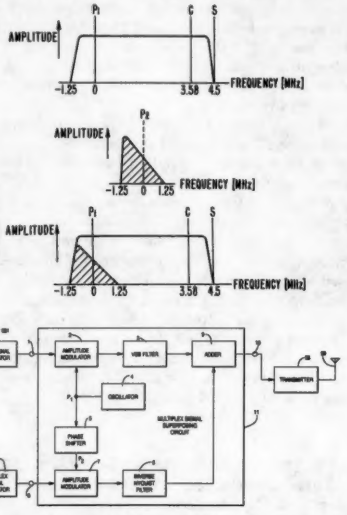
a carrier generating means for generating a first carrier;

a first amplitude-modulating means for amplitude modulating said carrier by said main signal to obtain a first vestigial sideband, amplitude-modulated signal;

a phase shifting means for shifting the phase of said first carrier by 90° to obtain a second carrier;

a second amplitude-modulating means for amplitude-modulating said second carrier by said multiples signal to obtain a double sideband, amplitude-modulated signal;

an inverse Nyquist filter having a Nyquist characteristic for filtering said double sideband, amplitude modulated signal to obtain a second vestigial sideband, amplitude-modulated signal, said inverse Nyquist filter having a frequency characteristic which is substantially symmetrical with respect to the frequency of said first carrier to a frequency characteristic of a Nyquist filter which is provided in a video detecting stages of a television receiver;



an adding means for adding said first and second vestigial sideband, amplitude-modulated signals to obtain a multiplexed signal; and

a transmitting means for transmitting said multiplexed signal. signal.

4,882,615

VIDEO SIGNAL PROCESSING SYSTEM

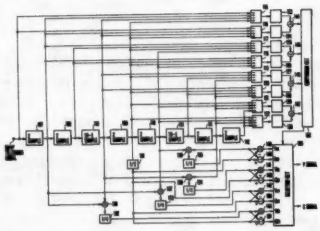
Katsuji Yoshimura; Tadayoshi Nakayama; Hisashi Ishikawa, and Chikara Sato, all of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 11,515, Feb. 5, 1987, abandoned. This application Sep. 28, 1988, Ser. No. 252,024

Claims priority, application Japan, Feb. 10, 1986, 61-025749; Feb. 10, 1986, 61-025750; Feb. 10, 1986, 61-025751; Feb. 10, 1986, 61-025752; Feb. 10, 1986, 61-025753; Feb. 14, 1986, 61-028949

Int. Cl.[4] H04N *9/78*

U.S. Cl. 358—31 **18 Claims**



1. A video processing system for use in an apparatus that receives a composite television signal having frequency-multiplexed luminance and chrominance signals, in which said composite color television signal is divided into a plurality of picture element signals by sampling it, and the luminance and chrominance signals frequency-multiplexed in each of said plurality of picture element signals are separated, comprising:

(a) remark picture element signal extracting means for selecting an arbitrary one of said plurality of picture element signals as a remark picture element signal;

(b) first reference picture element signal extracting means for

selecting as first reference picture element signals a first plurality of said sampled picture element signals whose chrominance signal frequency-multiplexed therein is of the same phase as that of the chrominance signal frequency-multiplexed in said remark picture element signal;

(c) second reference picture element signal extracting means for selecting as second picture element signals a second plurality of said sampled picture element signals whose chrominance signal frequency-multiplexed therein is of phase reverse to that of the chrominance signal frequency-multiplexed in said remark picture element signal;

(d) computer picture element signal forming means for forming plural kinds of computed picture element signals by receiving said remark picture element signals extracted by said remark picture element signal extracting means and said plurality of second reference picture element signals extracted by said second reference picture element signal extracting means and computing said computed picture element signals by use of said remark picture element signal and part of said plurality of second reference picture element signals;

(e) correlation state signal output means arranged to input said remark picture element signal extracted by said remark picture element signal extracting means, said plurality of first reference picture element signals extracted by said first reference picture element signal extracting means and said plurality of second reference element signals extracted by said second reference picture element signal extracting means, and to effect processing of said remark picture element signal, a part of said plurality of first reference picture element signals and a part of said plurality of second reference picture element signals, thereby outputting a plurality of correlation state signals representing correlation of the respective ones of said plurality of first reference picture element signals and the respective ones of said plurality of second reference picture element signals relative to said remark picture element signal; and

(f) separation means for selecting part of said plurality of computed picture element signals formed by said computed picture element signal forming means on the basis of said plurality of correlation state signals provided by said correlation state signal output means and separating and providing luminance signals and chrominance signals frequency-multiplexed in said remark picture element signal by using said selected part of said computed picture element signals.

4,882,616
COLOR FILTER FOR A SOLID STATE IMAGING DEVICE

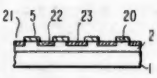
Daisuke Manabe, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 48,493, Apr. 24, 1987, abandoned, which is a continuation of Ser. No. 886,950, Jul. 23, 1986, which is a continuation of Ser. No. 796,689, Nov. 12, 1985, which is a continuation of Ser. No. 709,839, Mar. 8, 1985, which is a continuation of Ser. No. 393,252, Jun. 29, 1985, abandoned. This application Jun. 8, 1988, Ser. No. 205,591

Claims priority, application Japan, Jun. 29, 1981, 56-100808; Jun. 29, 1981, 56-100810

Int. Cl.[4] H04N *9/07;* **G03C** *5/00*

U.S. Cl. 358—44 **7 Claims**



1. A color imaging device comprising:

a solid state imaging device comprising a plurality of photosensitive portions and a plurality of non-photosensitive portions, surfaces of said photosensitive portions positioned lower than said non-photosensitive portions;

a dyeable resin layer formed on said solid state imaging device to form a flat surface, said dyeable resin layer being in contact with both of said photosensitive portions and said non-photosensitive portions;

a plurality of dyed areas formed in said dyeable resin layer positioned on said photosensitive portions, said dyed areas being dyed in a plurality of colors;

a plurality of non-dyed areas in said dyeable resin layer positioned on said non-photosensitive portions, said dyed areas being separated from each other by said non-dyed areas; and

a plurality of photo-interception areas on said non-dyed areas to define said dyed and said non-dyed areas.

4,882,617
PROJECTION DEVICE AND ASSOCIATED ELECTRO-OPTIC MONOCHROME DISPLAY DEVICE WITH PHOSPHOR LAYER AND INTERFERENCE FILTERS

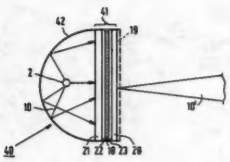
Leendert Vriens, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 17, 1987, Ser. No. 134,433

Claims priority, application Netherlands, Dec. 24, 1986, 8603299

Int. Cl.[4] H04N *9/31*

U.S. Cl. 358—60 **38 Claims**



27. An illumination source comprising a space accommodating a radiation source and bounded by a first flat wall, and a second reflective wall,

characterized in that the first wall is provided with at least one layer of a material luminescing in one colour, which layer can be excited by the radiation source,

and in that a first interference filter is arranged between the radiation source and the layer of luminescent material, which filter substantially completely passes radiation suitable for excitation and substantially completely reflects radiation generated in the luminescent material,

and in that a second interference filter is arranged on the other side of the layer of luminescent material, which second filter has a high transmission for light of the desired spectral characteristic which is emitted by the luminescent layer at small angles to the normal of the second filter, and in which the reflection considerably increases for light rays of the said spectral characteristic which extend at an angle of more than 20° to 35° to the normal on the second filter.

4,882,618
FM SIGNAL DEMODULATOR FOR VIDEO SIGNAL REPRODUCING APPARATUS

Masaki Tsuji, Fukaya, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Continuation of Ser. No. 38,661, Apr. 15, 1987, abandoned. This application Jan. 27, 1989, Ser. No. 302,140

Int. Cl.[4] H04N *5/213*

U.S. Cl. 358—167 **11 Claims**

1. An apparatus having means responsive to video input signals for generating FM luminance signals, comprising:

demodulation means for converting the FM luminance signals into base band luminance signals; and

noise removing means including clipping means and amplitude expanding means for clipping and amplitude expanding the base band luminance signals for substantially removing noise carrying portions therefrom while maintaining the amplitude of the base band luminance signals at a predetermined level.

4,882,619

HIGH RESOLUTION IMAGE PICKUP SYSTEM WITH COLOR DISPERSION MEANS

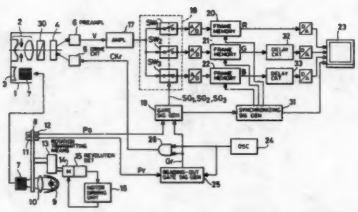
Akira Hasegawa; Susumu Takahashi, both of Hachiouji; Kiyoshi Tsuji, Tanashi; Kimihiko Nishioka, Hachiouji, and Hiroshi Matsui, Hino, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

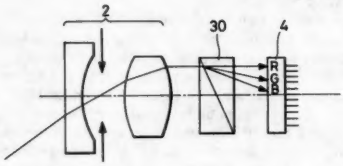
Filed Apr. 6, 1987, Ser. No. 35,013

Claims priority, application Japan, Apr. 7, 1986, 61-79421; Apr. 25, 1986, 61-96554

Int. Cl.[4] H04N *9/077*; A61B *1/06*; G02B *1/24*

U.S. Cl. 358—55 **5 Claims**





1. A high resolution image pickup system with color dispersion means comprising:

illuminating means capable of sequentially irradiating at least three kinds of color lights different from each other in wavelength onto an object under observation;

an objective lens system forming images of said object with said color lights coming from said object irradiated by said illuminating means;

a single solid-state image sensor provided with a plurality of picture elements regularly arrayed on a light-receiving surface thereof and receiving said object images formed, by said objective lens system; and

signal processing means connected to said image sensor for producing an image signal representing a color image of said object based on a photo-electric signal supplied from said image sensor, wherein:

color dispersion means is provided to be disposed in an optical path through which respective color lights coming from said object reach said image sensor and to receive and separately emanate said three kinds of color lights entering through the same path so that they are incident on different positions of said image sensor in accordance with their wavelengths;

said object images with said respective color lights are formed at positions different from each other on the light receiving surface of said solid-state image sensor through said objective lens system and said color dispersion means;

a compound image signal representing said object is produced in said signal processing means by superposing said image signals of said respective color lights obtained on the basis of said photoelectric signals supplied from said image sensor in response to each of said object images with said respective color lights; and

a color object image is represented observably by supplying said compound image signal to display means.

4,882,620

COLOR IMAGE READING APPARATUS WITH DISTRIBUTING TYPE LENS ARRAY AND SCAN RESPONSIVE SHUTTERS

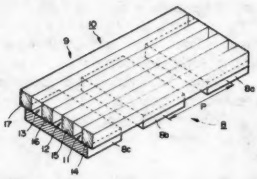
Norimitu Shimizu, and Chikaho Ikeda, both of Iwatsuki, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Apr. 27, 1988, Ser. No. 186,605

Claims priority, application Japan, Aug. 17, 1987, 62-203786

Int. Cl.[4] H04N *1/078, 1/46*

U.S. Cl. 358—75 **4 Claims**



1. A color image reading apparatus for scanning an original comprising:

an image sensor having a plurality of sensor elements each being independently disposed and corresponding to each pixel in a main scanning direction of the original;

a refractive index distributing type lens array for simultaneously imaging three pixels neighboring one another along a sub-scanning direction of said original on three different positions of each of said sensors;

a red filter, a blue filter, and a green filter each being disposed on each of said three different positions of each of said sensors; and

first, second, and third shutters each being disposed between each of said filters and each of said sensors, said shutters being made to be independently and sequentially opened and closed in a predetermined timing in response to the movement of said original in said sub-scanning direction.

4,882,621

COLOR IMAGE RECORDING APPARATUS

Akio Suzuki, and Yoshihiro Takada, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 6, 1987, Ser. No. 117,528

Claims priority, application Japan, Nov. 10, 1986, 61-265587

Int. Cl.[4] G03F *3/08*

U.S. Cl. 358—80 **6 Claims**

1. A color image recording apparatus comprising:

input means for inputting color image information representing a color image;

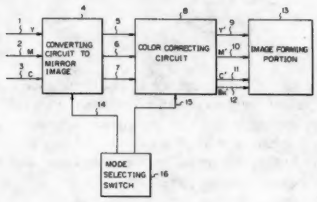
color correcting means for performing color correction of the color image information, and providing image signals

representing the color-corrected image information, using selectable correcting parameters;

selecting operable converting means for performing mirror-image conversion of the color image information;

image forming means for forming an image on a recording material based on the image signals from said color correcting means; and

mode selecting means for changing correcting parameters of said color correcting means and instructing a converting operation by said converting means, wherein said mode selecting means can select from between a first mode of operation, when a normal recording material is to be used to record the color image on a front surface of the record-



ing material so that the color image will appear on the front surface, and a second mode of operation, when a mirror-image recording material is to be used to record the color image on a back surface of the mirror-image recording material so that the color image will appear o t he front surface, and wherein said mode selecting means, when the first mode is selected, selects correcting parameters of said color correcting means for recording on the normal recording material with no mirror-image conversion by said converting means and, when the second mode is selected, selects correcting parameters of said color correcting means for recording on the mirror-image recording material and operates said converting means to provide mirror-image conversion.

4,882,622

SILHOUETTE CUTTING APPARATUS

Tetsuji Uzuda, Kawagoe; Takashi Kuramoto, Oomiya; Takeo Onga, Saitama; Teruo Suzuki, Kamifukuoka; Masaru Koizumi, Funabashi, and Takeo Kondo, Tokyo, all of Japan, assignors to Toppan Printing Co., Ltd., Tokyo, Japan

Filed Sep. 16, 1988, Ser. No. 245,214

Claims priority, application Japan, Sep. 18, 1987, 62-234153; Sep. 18, 1987, 62-234154; Mar. 8, 1988, 63-29859[U]

Int. Cl.[4] H04N *9/11, 1/46*

U.S. Cl. 358—80 **6 Claims**

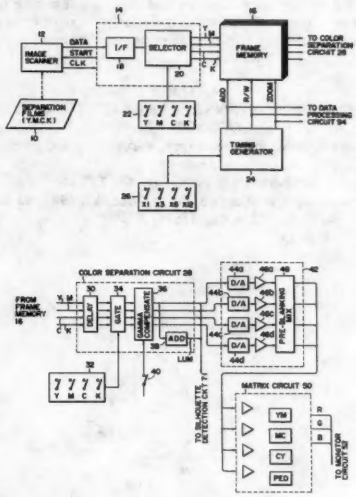
1. A silhouette cutting apparatus comprising:

input means for reading a separation film to obtain image information thereof;

display means for displaying the image information obtained by said input means;

means for designating a point in a desired figure of the displayed image;

detection means for comparing one of brightness and color of the designated point and that of other points of the displayed image so as to detect points of a boundary where their difference exceeds a predetermined value, thereby detecting silhouette image information of the desired image; and



an output section for forming a mask in accordance with the detected silhouette image information.

4,882,623

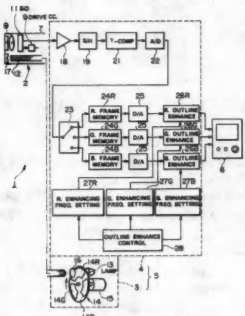
SIGNAL PROCESSING APPARATUS FOR ENDOSCOPE CAPABLE OF CHANGING OUTLINE ENHANCEMENT FREQUENCY

Akinobu Uchikubo, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Aug. 11, 1988, Ser. No. 230,816

Int. Cl.[4] A61B *1/04;* H04N *7/18*

U.S. Cl. 358—98 **18 Claims**



1. A signal processor for processing signals obtained from an electronic endoscope having an image pickup device, said signal processor, comprising:

video signal processing means operably connected to said image pickup device for processing an output signal from said image pickup device so as to obtain desired video signals;

outline enhancing means operably connected to said image pickup device including said video signal processing means for changing a frequency range and for processing an output signal from said image pickup device to thereby effect outline enhancement; and

means operably connected to said outline enhancing means for selecting and setting said frequency range relating to the operation of said outline enhancing means.

4,882,624

SYNCHRONIZING SIGNAL SEPARATION CIRCUIT FOR A TELEVISION RECEIVER

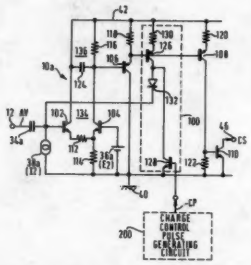
Hajime Sumiyoshi, Fukaya, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Mar. 11, 1988, Ser. No. 167,141

Claims priority, application Japan, Mar. 13, 1987, 62-56752

Int. Cl.[4] H04N *5/08*

U.S. Cl. 358—153 **9 Claims**



1. A synchronizing signal separation circuit for separating a composite synchronizing signal having a variable peak voltage subject to changes from a composite video signal, the composite synchronizing signal including a vertical synchronizing signal having a predetermined level for controlling vertical scanning in a television receiver, comprising:

composite separation means, including a coupling capacitor having a relatively low capacitance, for separating the composite synchronizing signal from the composite video signal received from a source of video signals; and

charge control means including a timing circuit for controlling the charging and discharging of the coupling capacitor, for maintaining the stability and the predetermined level of the vertical synchronizing signal after changes in synchronizing signal peak voltage.

4,882,625

IMPROVED DEFINITION TELEVISION SET WITH EXTERNAL LUMINANCE AND CHROMINANCE SIGNAL INPUTS

Toru Akiyama, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Nov. 15, 1988, Ser. No. 271,580

Claims priority, application Japan, Feb. 19, 1988, 63-37044

Int. Cl.[4] H04N *3/32*

U.S. Cl. 358—140 **3 Claims**

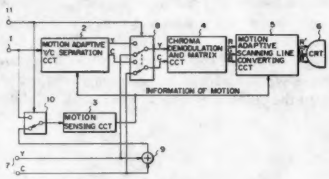
1. In an improved definition television (IDTV) set including,

a motion sensing means for sensing motion of images and generating a motion sensing signal,

a motion adaptive Y/C separating circuit separating a composite video signal into a luminance (Y) signal and a chrominance (C) signal on the basis of said motion sensing signal,

a chroma demodulation and matrix circuit generating three primary color signals of red (R), green (G), and blue (B) from separate luminance and chrominance signals separated at said Y/C separating circuit, and

a motion adaptive scanning line converting circuit for converting a line scanning method of said three primary color signals to a progressive line scanning, while effecting a field interpolation operation operation or a line interpolation operation to said three primary color signals on the basis of said motion sensing signal, wherein the improvement comprises: a first selecting means for alternatively



supplying external luminance and chrominance signals or said separate luminance and chrominance signals to said chroma demodulation and matrix circuit; and a second selecting means for alternatively supplying at least said external luminance signal or said composite video signal to said motion sensing means.

4,882,626

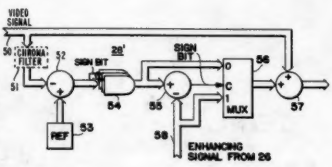
SIGNAL COMBINING CIRCUITRY

Russell T. Fling, Noblesville, and Donald H. Willis, Indianapolis, both of Ind., assignors to RCA Licensing Corporation, Princeton, N.J.

Continuation-in-part of Ser. No. 190,316, May 4, 1988, abandoned. This application Dec. 27, 1988, Ser. No. 290,859

Int. Cl.[4] H04N *5/14*

U.S. Cl. 358—166 **19 Claims**



1. Signal combining means comprising:

first and second input terminals for receiving first and second input signals;

a source of a reference value;

first means, coupled to said source and said first input terminal, for offsetting the amplitude values of said first input signal and providing an offset signal;

second means, coupled to said first means and to said second input terminal, for providing said second input signal only when the combination of said first and second input signals will produce a combined signal having amplitude values which are not in a predetermined range of values; and

third means, coupled to said first input terminal and to said second means for combining said first input signal and signal provided by said second means.

4,882,627

NOISE REDUCTION SYSTEM

Heinz-Werner Keesen, and Hartmut Peters, both of Hanover, Fed. Rep. of Germany, assignors to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Fed. Rep. of Germany

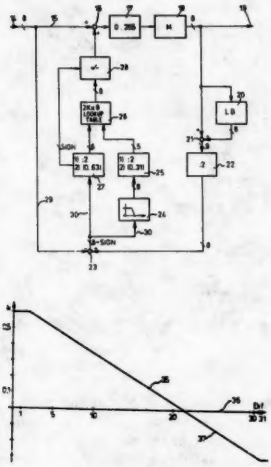
PCT No. PCT/EP87/00281, § 371 Date Feb. 8, 1988, § 102(e) Date Feb. 8, 1988, PCT Pub. No. WO87/07806, PCT Pub. Date Dec. 17, 1987

PCT Filed May 30, 1987, Ser. No. 163,827

Claims priority, application Fed. Rep. of Germany, Jun. 7, 1986, 3619222; Jun. 7, 1986, 3619223

Int. Cl.[4] H04N *5/213*

U.S. Cl. 358—166 19 Claims



1. In a noise reduction system for a digitalized video signal, the video signal including at least one of a luminance signal and a chrominance signal, the system including at least one memory means for storing and outputting an enhanced video signal, a filter receiving the output of said at least one memory means and producing a filtered output signal, signal difference forming means for forming a difference signal between the filtered output signal and the input signal, a correction circuit receiving said difference signal, and an algebraic adder for adding a correction produced by said correction circuit to the input video signal to produce the enhanced video signal, the improvement wherein said correction circuit weights said difference signal with a factor k, and said factor k has positive and negative values.

4,882,628

AMPLITUDE CHARACTERISTICS OF TV VERTICAL FREQUENCY SIGNAL

Yoshio Sugimori; Yousai Araki; Tadao Kurosaki, and Joji Urano, all of Tokyo, Japan, assignors to Nippon Television Network Corporation, Tokyo, Japan

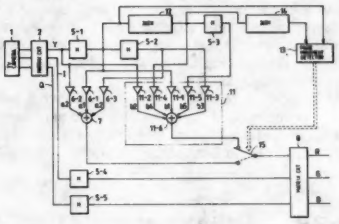
Filed Jan. 23, 1989, Ser. No. 299,377

Claims priority, application Japan, Oct. 31, 1988, 63-275382

Int. Cl.[4] H04N *5/213, 5/208, 9/64*

U.S. Cl. 358—167 3 Claims

1. An amplitude characteristics improving system for vertical TV frequency signal, comprising first means for operating amplitudes of a luminance signal obtained by a matrix operation of an output signal of a TV camera, a first signal obtained by delaying said luminance signal by one horizontal scan time and a second signal obtained by delaying said luminance signal by two horizontal scan time, second means for operation said luminance signal, said first signal, said second signal, a third signal obtined by delaying said luminance signal by one field and one horizontal scan time and a fourth signal obtained by delaying said luminance signal by one field and two horizontal



scan time and third means responsive to an output of either said first means or said second means to provide an improved vertical TV frequency signal.

4,882,629

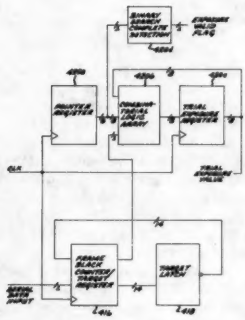
ADAPTIVE EXPOSURE CONTROL SYSTEM

James L. Faulkerson, Woodside; Raymond L. Picard, Scotts Valley; Edward J. Menard, Sunnyvale; Sanford M. Bennett, Mountain View; Timothy J. McCarthy, San Jose; Edwin S. Foden, Sunnyvale; Michael A. Gipe, Cupertino; Allan A. Moluf, San Jose; Michael W. Jacobs, Sunnyvale, and Boatner Bruce E., San Jose, all of Calif., assignors to Everex Ti Corporation, Fremont, Calif.

Division of Ser. No. 48,100, May 8, 1987, which is a continuation-in-part of Ser. No. 912,834, Sep. 26, 1986. This application Dec. 9, 1988, Ser. No. 282,332

Int. Cl.[4] H04N *1/04*

U.S. Cl. 358—464 10 Claims



1. Optical scanning apparatus employing adaptive scanner exposure control, comprising:

an image sensor array of photosensitive pixel elements;

means for exposing said pixel elements during sequential exposure intervals of selectable duration for capturing sequential images of the portion of said surface within the field of view of said array;

means for reading out from said imaging array after each exposure interval thereof resulting digital data values for said pixel elements and providing sequential frames of binary-valued image data wherein one possible value for each pixel indicates a white pixel and the other possible value indicates a black pixel;

means responsive to a scanner "initiate" signal for adaptively determining an exposure interval duration for said surface, said means comprising a means for measuring the reflectivity of a background portion of said surface, comprising:

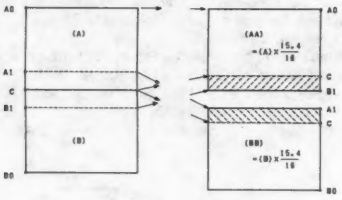
means for providing an initial exposure interval duration;
means for capturing an image of a background portion of said surface with said imaging array employing said initial exposure interval duration;
means for determining the number of black pixels in said resulting image;
means for repetitively adjusting said exposure interval duration, capturing an image of said background portion and determining the number of black pixels in said resulting image; and
means responsive to said black pixel number determinations for setting said exposure time to an exposure value which provides a substantially zero black pixel count in said image of said background portion.

4,882,630

PRINTING APPARATUS AND FACSIMILE EQUIPMENT

Hideya Yamaguchi, Hashima; Hiroyuki Hayasaki, Ogaki; Masamichi Kawakami, Hashima; Yuji Houjiyou, Hashima; Yoshihiro Hobo, Hashima; Youichirou Arimatsu, Anpachi; Yasunori Tsuji, Hashima; Masaaki Hasegawa, and Seiji Katou, both of Anpachi, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed May 16, 1988, Ser. No. 195,104
Claims priority, application Japan, Jun. 12, 1987, 62-147368
Int. Cl.[4] H04N *1/393*
U.S. Cl. 358—451 **28 Claims**



1. A printing apparatus comprising;
an image reading means which reads an original as dot data and outputs the dot data as image data;
an image memory which stores at least one sheet of image data read by said image reading means;
a printing means which prints the image data stored in said image memory as a dot image whose ratio of resolutions in the main scanning direction and subscanning direction is x:y; and
an image processing circuit which, when the ratio of resolutions of the data read out from said image memory as the data to be printed in the main scanning direction, and the data read out from said image memory as the data to be printed in the subscanning direction is X:Y (where $(x/X) \neq (y/Y)$), enlarges or reduces said data to be printed in the main scanning direction and said data to be in the subscanning direction to the ratio of (x/X):(y/Y) to give them to said printing means.

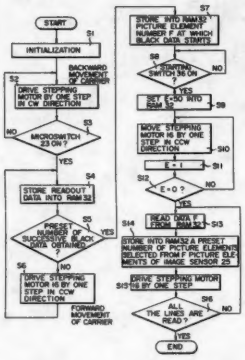
4,882,631

IMAGE READING DEVICE

Kazunori Mine; Keisuke Murakami, and Hiromasa Urata, all of Shizuoka, Japan, assignors to Tokyo Electric Co., Ltd., Tokyo, Japan

Filed Nov. 8, 1988, Ser. No. 268,451
Claims priority, application Japan, Nov. 10, 1987, 62-283696
Int. Cl.[4] H04N *1/12*
U.S. Cl. 358—471 **6 Claims**

1. An image reading device comprising:
an original table having a surface area defined as a reading section for reading the image of the original;
a mark positionedadjacent to one end of said original table in the lengthwise direction of the reading section and having a light reflection factor different from that of the surroundings, said mark having a first side extending in a sub-scanning direction which is substantially the same as the lengthwise direction of said reading section and a second side extending from the first side towards said reading section at an angle with respect to the first side smaller than an angle made between the first side and a main scanning direction which is substantially the same as the width direction of said reading section;
a carrier driven towards said reading section across the mark in the sub-scanning direction;
illumination means for illuminating the original and mark;



an image sensor fixed on said carrier and having a plurality of light receiving elements arranged in a line to read the image in the main scanning direction; and
reading control means for detecting that image data corresponding to the light reflection factor of said mark is output from at least a preset number of successive light receiving elements while said image sensor is being moved by the movement of said carrier to pass across said mark, and setting the reading starting position in the main scanning direction by using, as a reference position, the position of the light receiving element which corresponds to the second side of said mark and is included in said light receiving elements which output the image data.

4,882,632

COLOR VIDEO SIGNAL REPRODUCING APPARATUS USING FREQUENCY CONVERTED CHROMINANCE SIGNAL

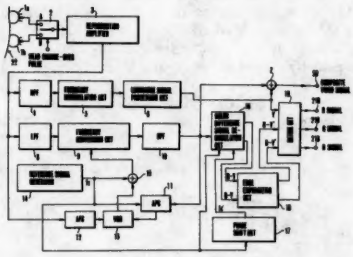
Hiroto Yasumura; Masahide Hirasawa; Minoru Noji, all of Kanagawa; Susumu Kozuki, Tokyo; Koji Takahashi, and Katsuji Yoshimura, both of Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 21, 1987, Ser. No. 111,361
Claims priority, application Japan, Oct. 27, 1986, 61-255121
Int. Cl.[4] H04N *9/83*
U.S. Cl. 358—330 **5 Claims**

1. A reproducing apparatus for reproducing a composite signal from a record bearing medium on which said composite signal is recorded, said composite signal being formed by frequency multiplexing a low-band converted carrier chrominance signal obtained by frequency-converting a carrier chrominance signal from a high frequency band to a low frequency band and a frequency-modulated luminance signal, comprising:
(A) reproducing means for reproducing said composite signal from said record bearing medium;
(B) separating means for separating the frequency-

modulated luminance signal and the low-band converted carrier chrominance signal from the composite signal reproduced by said reproducing means and for outputting the separated signals;

(C) frequency-demodulating means for demodulating the frequency-modulated luminance signal outputted from said separating means and for outputting the demodulated signal;



(D) conversion means for converting the low-band converted carrier chrominance signal outputted from said separating means into two kinds of color difference signals and for outputting the converted signals; and

(E) R, G and B signal generating means for generating R, G and B signals by using the luminance signal outputted from said frequency-demodulating means and the two kinds of difference signals outputted from said conversion means.

4,882,633

VIDEO SIGNAL REPRODUCING APPARATUS WITH MEMORY

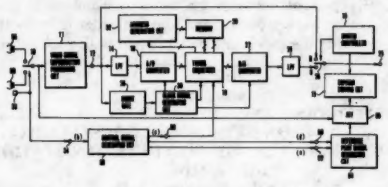
Yoshihiro Nakatani, and Tsutomu Fukatsu, both of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 30, 1987, Ser. No. 139,780

Claims priority, application Japan, Jan. 9, 1987, 62-002872; Jan. 9, 1987, 62-002873; Jan. 9, 1987, 62-002874

Int. Cl.[4] H04N *5/95*

U.S. Cl. 358—339 **22 Claims**



22. A video signal reproducing apparatus comprising:

(a) a reproducing head arranged to reproduce a video signal from a record bearing medium;

(b) storing means arranged to receive said video signal reproduced by said reproducing head and to be capable of storing one field portion of said video signal;

(c) switching means for changing the state of said storing means from a signal writing state over to a signal reading state and vice versa;

(d) detecting means for detecting a phase difference between a horizontal synchronizing signal included in a video signal read out from said storing means and a horizontal synchronizing signal included in a video signal written into said storing means; and

(e) control means for controlling signal writing into said storing means and signal reading from said storing means on the basis of said phase difference detected by said detecting means.

4,882,634

APPARATUS FOR REPRODUCING INFORMATION SIGNALS BY INTERMITTENTLY FEEDING TAPE-SHAPED RECORD BEARING MEDIUM

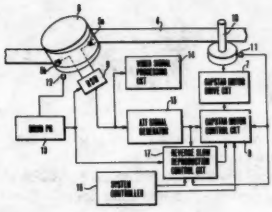
Keiji Satoh, and Susumu Kozaki, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 17, 1987, Ser. No. 27,161

Claims priority, application Japan, Mar. 18, 1986, 61-058155; Mar. 18, 1986, 61-058156

Int. Cl.[4] G11B *21/10*

U.S. Cl. 360—10.2 **17 Claims**



1. An information signal reproducing apparatus for reproducing information signals from a tape-shaped record bearing medium on which many tracks are formed, comprising:

(a) a rotary head arranged to trace said tape-shaped record bearing medium;

(b) moving means for moving said tape-shaped record bearing medium in longitudinal direction;

(c) control means for controlling said moving means in such a manner that said moving means is alternately in a first state and a second state, said moving means moving said tape-shaped record bearing medium at a predetermined speed in said first state, and said moving means not moving said medium in said second state;

(d) means for generating a tracking error signal which indicates the tracking error of said rotary head relative to one of said many tracks, by using a signal reproduced by said rotary head; and

(e) means for generating a first signal for indicating a first timing at which a level of said tracking error signal is a predetermined level while said moving means is in said second state;

said control means changing a state of said moving means between said first state and said second state at a timing as a predetermined period after said first timing.

4,882,635

ROTATING DRUM DEVICE FOR A VCR IN WHICH THE POSITION OF THE MAGNETIC HEAD IS CONTROLLED BY A MAGNETIC POSITIONING DEVICE

Yukiharu Sanai, Nagaokakyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 14, 1987, Ser. No. 73,163

Claims priority, application Japan, Jul. 16, 1986, 61-168732; Jan. 10, 1987, 62-3713

Int. Cl.[4] G11B *5/53, 5/588*

U.S. Cl. 360—10.2 **30 Claims**

19. A helical-scanning type rotating drum device which comprises:

(a) a rotating drum around which a magnetic tape is wrapped at a predetermined angle, said magnetic tape

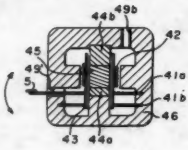
having a traveling speed during use of said rotating drum device;

(b) a magnetic head for reproducing electric signals recorded on said magnetic tape;

(c) a supporting member for supporting said magnetic head on said rotating drum so as to be movable along the axis of rotation of the same;

(d) a coil mounted on said supporting member, said coil having a control electric current flowing therein during use of said rotating drum device, said control electric current having a controllable intensity;

(e) a magnetic unit attached to said rotating drum and facing said coil so as to cause displacement of said supporting



member depending on the intensity of said control electric current flowing in said coil; and

(f) a control means for producing said control electric current in response to the traveling speed of said magnetic tape,

wherein:

(g) said magnetic unit comprises a rod magnet which is inserted in said coil mounted on said supporting member;

(h) said magnetic unit further comprises a yoke;

(i) said yoke has a cylindrical shape so as to surround said supporting member; and

(j) said yoke is provided with a window through which a magnetic head fitting part of said supporting member is extended.

4,882,636

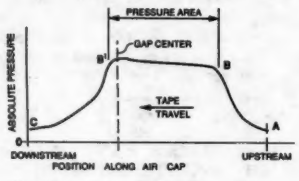
HIGH SPEED CONTACT PRINTING PROCESS FOR PRERECORDED MAGNETIC TAPE

Wayne E. Billings, New Castle, Del.; Robert F. Phillips, Landenberg, Pa., and John E. Gantzhorn, Jr., Hockessin, Del., assignors to Otari Electric Company, Ltd., Tokyo, Japan

Filed Oct. 6, 1987, Ser. No. 105,765

Int. Cl.[4] G11B *5/86, 5/008*

U.S. Cl. 360—16 **6 Claims**



1. In a high speed contact printing process for the replication of a magnetic image on a copy tape wherein the magnetic surface of the copy is brought into intimate contact with a master tape in a print station comprising a stationary pressure cap and a rotating tape support surface, the improvement wherein slippage between the copy and master tapes is prevented by applying fluid pressure to the tapes in the area defined by the width of the tapes at the point where replication is initiated, and extending upstream along the length of the tapes, and not downstream of said point, the length of said area exceeding its width, said fluid pressure being sufficient to cause air to evacuate from between said master and copy tapes.

4,882,637

COPYING APPARATUS FOR COPYING A MAGNETIC PATTERN FROM A MASTER MAGNETIC TAPE ON A DUPLICATE MAGNETIC TAPE AND METHOD OF OPERATING SUCH A COPYING APPARATUS

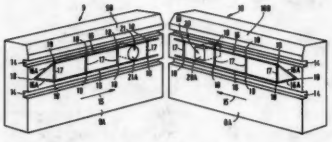
Jozef M. Duurland, Leusden, and Johannes J. Roering, Soest, both of Netherlands, assignors to Polygram International Holding B.V., Baarn, Netherlands

Filed Jun. 17, 1988, Ser. No. 209,128

Claims priority, application Netherlands, Jun. 25, 1987, 8701477

Int. Cl.[4] G11B *5/86*

U.S. Cl. 360—16 **12 Claims**



11. A copying apparatus for copying a magnetic pattern from a master magnetic tape on a duplicate magnetic tape, comprising:

two facing elongate platens having facing substantially parallel sides between which a gap is formed having an entrance end and an exit end and having at least first and second rows of passages in facing gap sides of the two platens said rows converging into a V-shape towards said entrance end, the axis of symmetry of said V-shape extending substantially parallel to the longitudinal direction of the platens;

transport means adapted to move the master magnetic tape and the duplicate magnetic tape through the gap in the longitudinal direction of the platens;

pressure means adapted to press the master magnetic tape and the duplicate magnetic tape against one another in the gap, by means of a pressurized fluid fed from the passages in the platens adjacent the two tapes into the gap, to ensure that as the tapes move through the gap the air initially present between the tapes is expelled at least substantially towards the tape edges in order to bring the tapes inside the gap in intimate contact with each other.

4,882,638

PCM RECORDING AND REPRODUCING APPARATUS HAVING COMMON DATA FRAME CONSTRUCTION FOR SIGNAL SOURCES OF VARYING QUANTIZATION BIT NUMBER

Ken Onishi, and Kazuhiro Sugiyama, both of Nagaokakyo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 10, 1986, Ser. No. 917,617

Claims priority, application Japan, Oct. 11, 1985, 60-227187; Jan. 23, 1986, 61-12877; Jan. 23, 1986, 61-12878

Int. Cl.[4] G11B *5/00, 5/09*

U.S. Cl. 360—32 **8 Claims**

1. A pulse code modulation (PCM) recording and reproducing apparatus, comprising:

means for sampling analog signals from N channels, N being an integer, at a predetermined sampling frequency;

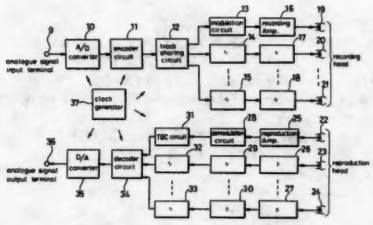
means for converting each sample into a digital signal of a specific number of bits Bi, Bi being a quantization bit number selectable from a plurality of quantization bit numbers Bi: i=1, . . . , k; k being an integer;

means for assembling frames of PCM data each comprising S samples;

means for assembling blocks of PCM data each comprising Tr tracks, each track corresponding to one frame;

means for setting the number of bits per frame to a value TA such that

$$TA = n \times LCM\ (Bi,\ i=1, \ldots, k) + m$$



n: integer

LCM(Bi,i=1, . . . , k): least common multiple of all values Bi for i=1, . . . , k

m: an additional number of bits required for synchronization and control of said digital signals; and

means for setting the number of samples per block to a value TB such that TB=N×S×Tr, wherein the ratio of TA to TB is a simple integer.

4,882,639

CHANGEOVER WRITING CIRCUIT FOR MAGNETIC DISK APPARATUS OPERABLE AT PLURAL DENSITIES

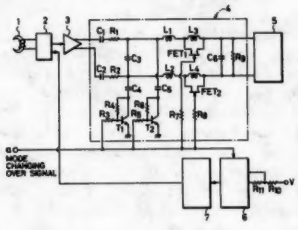
Masahiro Nasu, and Kiyoto Abe, both of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 879,475, Jun. 27, 1986, abandoned. This application Nov. 22, 1988, Ser. No. 274,685

Claims priority, application Japan, Jul. 3, 1985, 60-147478

Int. Cl.[4] G11B *5/09*

U.S. Cl. 360—65 **2 Claims**



1. A changeover read-write circuit for a magnetic recording and reproducing apparatus including a magnetic head for reading and writing data on a magnetic medium, comprising:

a bias changeover circuit connected to a voltage source providing two different voltages to the bias changeover circuit, whereby the bias changeover circuit outputs two different voltages in response to a two level mode changing over signal provided by a host computer to the bias changeover circuit, the bias changeover circuit outputting a first voltage upon receiving a first level mode changing over signal, and outputting a second voltage upon receiving a second level mode changing over signal;

a write circuit connected to the bias changeover circuit so as to receive the two voltages output by the bias changeover circuit, and also connected to receive input data from the host computer to output in response thereto writing signals at two different current levels, the first current level writing signals being output proportionally to the first voltage output by the bias changeover circuit and the second current level writing signals being output proportionally to the second voltage output by the bias changeover circuit; and

a changeover circuit connected to receive the outputs of the write circuit and to provide same to the magnetic head for writing on the magnetic medium, and connected to receive read signals from the magnetic head for reading from the magnetic medium, the changeover circuit changing over from reading to writing and vice versa in response to signals from the host computer.

4,882,640

RECORDING AND REPRODUCING APPARATUS USING RECORDED NUMERAL INFORMATION SIGNALS FOR PROGRAM DETECTION

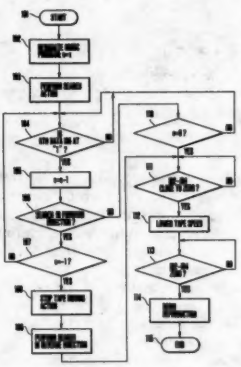
Tetsuya Wakui, Chiba, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 29, 1987, Ser. No. 43,936

Claims priority, application Japan, May 15, 1986, 61-109687

Int. Cl.[4] G11B *15/52*

U.S. Cl. 360—73.05 **9 Claims**



1. A reproducing apparatus for reproducing main information signals from a tape-shaped record bearing medium on which numeral information signals indicative of positions on said medium are recorded, the numeral value of said numeral information signals successively varying along the longitudinal direction of said tape-shaped record bearing medium, comprising:

(a) moving means for moving said tape-shaped record bearing medium, in the longitudinal direction;

(b) reproducing means for reproducing from said recording medium said main information signals and said numeral information signals;

(c) manually operable means for instructing said apparatus to look up a desired position of said tape-shaped record bearing medium;

(d) a first control means for setting the medium moving speed of said moving means to a first speed in response to look-up instruction given by said manually operable means;

(e) a second control means for changing the medium moving speed of said moving means from said first speed to a second speed which is slower than said first speed in response to that a difference between a desired value corresponding to the desired position and the numeral value of said numeral information signals reproduced by

said reproducing means becomes less than a predetermined value; and

(f) a third control means for changing the medium moving speed of said moving means from said second speed to a third speed which is slower than said second speed in response to that a difference between the desired value and the numeral value of said reproduced numeral information signals becomes zero, said tape-shaped record bearing medium being moved at the third speed while said main information signals are recorded.

4,882,641

METHOD FOR CONTROLLING MODE OF INFORMATION SIGNAL REPRODUCING APPARATUS

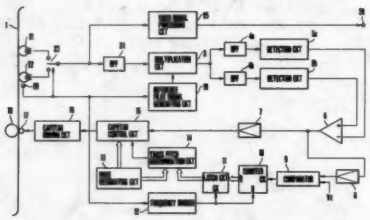
Junichi Sato, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 29, 1987, Ser. No. 43,879

Claims priority, application Japan, May 15, 1986, 61-109689

Int. Cl.[4] G11B 5/52, 15/467

U.S. Cl. 360—77.14 6 Claims



1. An information signal reproducing apparatus for reproducing an information signal from a recording medium having a plurality of different pilot signals recorded in a superimposed state upon said information signal in predetermined rotation, with recording tracks formed thereon at one of different selectable track pitches, comprising:

(a) moving means for moving said recording medium;

(b) a reproducing head arranged to reproduce said information signal and said plurality of different pilot signals from said recording medium;

(c) speed change-over means for changing over a recording medium moving speed of said moving means, said speed change-over means being arranged to set said recording medium moving speed to a plurality of different normal speeds at which said reproducing head traces said tracks in parallel therewith when said tracks are formed at the respective ones of said plurality of different track pitches and to a special speed at which said reproducing head does not trace said tracks in parallel therewith at any time when said tracks are formed at any one of said plurality of different track pitches;

(d) tracking error signal generating means for generating, using said plurality of different pilot signals reproduced by said reproducing head, a tracking error signal which indicates a positional deviation of said reproducing head from one of said tracks;

(e) detecting means for detecting that the positional deviation indicated by said tracking error signal is a predetermined degree, to generate a detection pulse signal;

(f) a counter for counting said detection pulse signal during every predetermined period of time;

(g) a latch for latching a value of count of said counter at every predetermined period of time as mentioned above;

(h) mode setting means for setting the apparatus to a normal mode where said moving means moves the recording medium at a normal speed and to a special mode where said moving means moves the recording medium at said special speed; and

(i) discriminating means for discriminating the track pitch of said track, on the basis of the mode set by said mode setting means and an output of said latch.

4,882,642

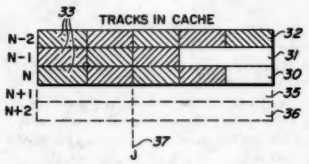
SEQUENTIALLY PROCESSING DATA IN A CACHED DATA STORAGE SYSTEM

Gerald E. Tayler, Berthoud, Colo., and Robert E. Wagner, Tucson, Ariz., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 2, 1987, Ser. No. 68,857

Int. Cl.[4] G06F 9/00

U.S. Cl. 360—78.11 19 Claims



1. In a method of operating a cache which is interposed between a host processor and a backing store, the cache and the backing store including addressable like-capacity data storing tracks, where a track of data is the amount of data storable on one track of a magnetic disk recorder the cache including means for addressing tracks in the cache using addresses of the backing store whenever the cache tracks are individually allocated for storing data with respect to a respective addressable track in the backing store;

the steps of:

measuring and storing the measurement of those portions of each of said allocated tracks that are accessed by the host processor during the current allocation of the cache track to one of the tracks in the backing store;

selecting a group of the cache tracks that are addressable by contiguous ones of the backing store addresses;

establishing first and second access extent thresholds;

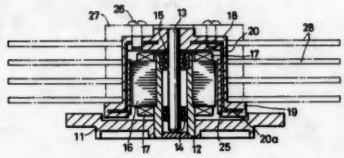
in each of the selected groups, comparing, as at first comparison, the stored measurement for one of the tracks in the selected group with said first access extent threshold, if the first comparison shows that the stored measurement for the one track is less than the first access extent threshold, operating the cache for said one cache track in a random access mode, if the first comparison shows that the one cache track stored measurement is greater than the first access extent threshold, then combining the stored measurements for all cache tracks in the group having the one cache track; and

comparing, as a second comparison, said combined stored measurement with said second access extent threshold, if said second comparison shows that the combined measurement exceeds said second access extent threshold, preparing the cache for cache bypass operations, if said second comparison shows that the combined measurement is not greater than said second access extent threshold, then establishing for tracks in the backing store having addresses contiguous with the backing store address of the one cache track a predetermined requested data promotion and demotion algorithm.

4,882,643
DISC DRIVE MOTOR

Yozo Shirotori, Nagano, Japan, assignor to Kabushiki Kaisha Sankyo Seiki Seisakusho, Nagano, Japan

Continuation of Ser. No. 89,802, Aug. 27, 1987, abandoned. This application Apr. 20, 1989, Ser. No. 341,274
Claims priority, application Japan, Aug. 27, 1986, 61-200975
Int. Cl.[4] G11B *5/012*
U.S. Cl. 360—99.08 6 Claims

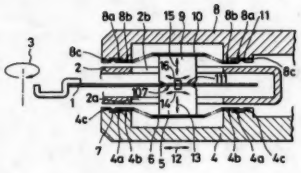


1. A disk drive motor, comprising:
a motor stator;
a unitary hub for supporting at least one disk at an external circumferential surface thereof, said unitary hub being formed of diecast aluminum in a shape of a cup so as to form a one-piece structure, said unitary hub having a hub flange at a side opposite a bottom of said cup of said unitary hub;
a yoke of magnetic material having a yoke flange embedded within said hub flange such that said yoke flange is surrounded by material of said unitary hub, said yoke being exposed at an exposed portion at an internal circumferential surface of said unitary hub; and
a rotor magnet disposed at an internal circumferential surface of said unitary hub in external opposition to said motor stator and being fixed to said exposed portion of said yoke.

4,882,644
MAGNETIC HEAD SUPPORTING MECHANISM

Ippo Kimura; Naoyuki Okumura; Tomoe Aruga, and Yoshio Arai, all of Nagano, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan

Filed Nov. 9, 1987, Ser. No. 118,788
Claims priority, application Japan, Nov. 12, 1986, 61-268956; Nov. 12, 1986, 61-268954; Nov. 13, 1986, 61-270754; Nov. 13, 1986, 61-270753; Nov. 25, 1986, 61-280313; Nov. 25, 1986, 61-280312; Jul. 13, 1987, 62-174218
Int. Cl.[4] G11B *5/48*
U.S. Cl. 360—104 13 Claims



1. A magnetic head supporting mechanism for use with a flexible disk made of a medium suitable for magnetic recording and reproducing, comprising:
a first magnetic head for making contact with one side of said flexible disk;
a first supporting plate for supporting said first magnetic head in a manner to allow said first magnetic head to have freedom of pivotal movement in the radial and tangential directions of said flexible disk;
a first carriage for mounting and carrying said supporting plate;
a second magnetic head for making contact with the other side of flexible disk to hold said flexible disk between itself and said first magnetic head;
a second supporting plate for supporting said second magnetic head in a manner to allow said second magnetic head to have freedom of pivotal movement in the radial and tangential directions of said flexible disk;
a second carriage for mounting said second supporting plate and rotating said second supporting plate and said second magnetic head in a manner to face said first carriage, said second carriage being carried by said first carriage to follow the same; and
press means for pressing said first magnetic head and said second magnetic head to each other,
wherein said first and second supporting plates each comprise: a peripheral portion carried by a respective one of said carriages; a plurality of arms spaced from, and enclosed by, said peripheral portion; a central portion spaced from, and enclosed by, said arms and supporting a respective magnetic head; a first pair of tie bars extending along a first axis and connecting said arms to said peripheral portion; and a second pair of tie bars extending along a second axis and connecting said central portion to said pair of arms, said central portion being supported by said second pair of tie bars and said arms being supported by said first pair of tie bars, each said pair of tie bars being constructed to be allowed to twist about its respective axis, said arms being constructed to be allowed to warp when forces are applied thereto via the respective magnetic head, for permitting the respective magnetic head to pivot in a manner to follow the inclination of the flexible disk, said first and second axes normally lying in a plane parallel to the plane of the flexible disk, one of the axes extending in the radial direction of the disk and the other of the axes extending in the tangential direction of the disk, and said peripheral portion, said arms, said central portion and said tie bars being constructed to give said supporting plate a defined spring rate perpendicular to the plane of the flexible disk,
wherein the spring rate of said first and second supporting plate in said generally perpendicular direction is set at about 50 g/mm or more, and
wherein said first supporting plate and said second supporting plate support said first magnetic head and said second magnetic head, respectively, such that they can move in a generally perpendicular direction to the plane of said flexible disk in a manner constrained solely by the spring rates of said first supporting plate and said second supporting plate in the generally perpendicular direction.

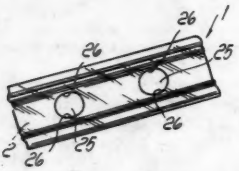
4,882,645
MASK STRUCTURE FOR CASSETTES OF MAGNETIC TAPE

Abramo Bordignon, Senago, Italy, assignor to A.T.B. S.p.A., Senago, Italy

Filed Nov. 23, 1987, Ser. No. 124,192
Claims priority, application Italy, Dec. 4, 1986, 23924/86[U]
Int. Cl.[4] G11B *23/02*
U.S. Cl. 360—132 2 Claims

1. In a magnetic tape cassette of the type comprising a box-like housing formed of two half-shells, a pair of hubs rotatably located within said housing, a magnetic tape wound on at least one of said hubs, a pair of through apertures formed on said housing coaxially with said hubs to allow passage of drive spindles of a cassette recorder or the like, said through apertures having annular folded edges at least partially projecting inwardly of said housing, said annular folded edges defining a substantially cylindrical outer surface having an outer diameter;
a mask structure to be arranged inside said housing and comprising a pair of sheet-like elements positionable be-

tween said hubs and said half-shells, said sheet-like element having a pair of holes located concentrically with said housing apertures to allow insertion of said annular folded edges therethrough, and further comprising means for removably fastening said sheet-like elements to said housing, wherein said fastening means comprise peripheral portions of said holes which project at least partially inwardly thereof to radially interfere with said outer



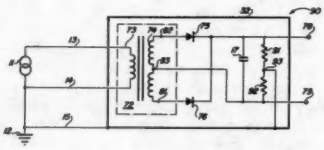
cylindrical surface of said annular folded edges and to thereby resiliently and frictionally engage therewith, whereby said sheet-like elements are at least temporarily secured to said half-shells during mutual coupling thereof, having a substantially elliptical configuration defining a major axis and a minor axis perpendicular therebetween, said major and said minor axes being respectively larger and smaller than said outer diameter of said annular folded edges.

4,882,646

PROTECTIVE GROUNDING AND REFERENCING ARRANGEMENT FOR HIGH VOLTAGE BULK SUPPLY

Luther L. Genuit, Scottsdale, Ariz., assignor to Honeywell Bull Inc., Phoenix, Ariz.

Filed Dec. 14, 1987, Ser. No. 132,838
Int. Cl.[4] H02H *9/04*
U.S. Cl. 361—42 **15 Claims**



13. A bulk supply for converting electrical energy from an a-c source to high voltage d-c, said bulk supply comprising:

(A) a grounded, electrically conductive chassis;

(B) an isolation transformer having a primary winding and a secondary winding;

(C) means coupling the a-c source to said primary winding;

(D) first and second output terminals;

(E) rectifier means electrically positioned intermediate said secondary winding and said first and second output terminals, said rectifier means being configured and connected to convert a-c voltage appearing across said secondary winding to d-c voltage appearing across said first and second output terminals;

(F) a resistive divider network connected between said first and second output terminals, said resistive divider network including first and second resistors joined at a junction; and

(G) means electrically connecting said junction to said chassis;

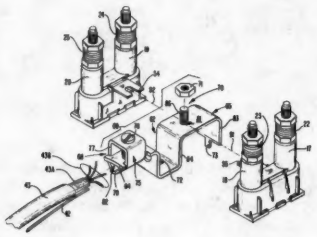
whereby said resistive divider network causes the d-c voltage appearing across said output terminals to be floating with respect to said chassis, thereby limiting fault currents which result from short circuits between said output terminals and ground potential ton on-hazardous levels.

4,882,647

COMBINATION APPARATUS FOR CLAMPING GROUND CONDUCTOR AND FOR MOUNTING LIGHTNING PROTECTOR

Thomas J. Collins, Wall Township, Monmouth County, N.J., assignor to Keptel, Inc., Tinton Falls, N.J.

Filed Dec. 15, 1988, Ser. No. 284,671
Int. Cl.[4] H01R *3/06*
U.S. Cl. 361—119 **4 Claims**



1. Combination apparatus for clamping ground conducting means and for mounting lightning protecting means, said combination apparatus for being mounted on apparatus to be grounded, comprising:

an integrally formed, electrically conductive ground bracket including an outwardly extending upwardly curved first end portion and an upwardly extending second end portion;

a clamping frame surrounding said outwardly extending upwardly curved first end portion of said ground bracket, said clamping frame including an upwardly extending top portion provided with a threaded aperture and a downwardly extending bottom portion which bottom portion in combination with said outwardly extending upwardly curved first end portion of said ground bracket provides an opening for receiving said ground conductor means;

a ground conductor means securing screw extending through said threaded aperture and for being screwed into said aperture to force said outwardly extending upwardly curved first end portion of said ground bracket and said downwardly extending bottom portion of said clamping frame in towards each other to clamp said ground conductor means therebetween;

first mounting means provided on said ground bracket for mounting said lighting protecting means on top of said ground bracket; and

second mounting means provided on said ground bracket for mounting said ground bracket on said structure to be grounded.

4,882,648

CAPACITANCE PROBE FOR USE IN ABSORBENT SYSTEMS

Marcel G. Verrando, III, Ocala, Fla., assignor to Pall Corporation, East Hills, N.Y.

Filed Oct. 11, 1988, Ser. No. 255,667
Int. Cl.[4] H01G *5/00*; G01R *27/26*; B01D *53/04*
U.S. Cl. 361—286 **11 Claims**

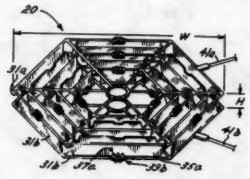
1. A capacitor for use in sensing variations in the dielectric constant of a bed of particles comprising:

a first member having a plurality of flat plate elements interconnected by a network of strip elements;

the plate elements being oriented substantially parallel to a common axis;

the strip elements being oriented substantially perpendicular to the common axis;

a second member of substantially the same configuration as the first member, the second member being inverted and rotated relative to the first member so that the plate elements of the first member are interposed between the plate



elements of the second member and the plate elements of each member align with at least some of the strip elements of the other member; and

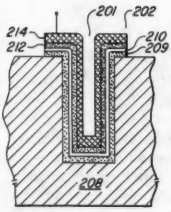
at least some of the plate elements of the first member interlocking with at least some of the strip elements of the second member in nonconducting electrical contact whereby a substantially rigid structure is formed.

4,882,649

NITRIDE/OXIDE/NITRIDE CAPACITOR DIELECTRIC

Ih-Chin Chen, Dallas; Bing W. Shen, Richardson, and Robert R. Doering, Plano, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 29, 1988, Ser. No. 174,751
Int. Cl.[4] H01G *7/00, 4/06;* H01L *29/34*
U.S. Cl. 361—313 **9 Claims**



1. A method for forming a capacitor at a surface of a semiconductor body, comprising the steps of:

chemically vapor depositing a first layer of silicon nitride at said surface;

forming a layer of silicon dioxide completely overlying said first layer of silicon nitride;

forming a second layer of silicon nitride completely overlying said layer of silicon dioxide;

forming a conductive capacitor plate completely overlying said second layer of silicon nitride and in direct contact therewith.

4,882,650

MAGNESIUM TITANATE CERAMIC AND DUAL DIELECTRIC SUBSTRATE USING SAME

Galeb H. Maher, North Adams, Mass., and Susan E. Corah, Eagleville, Pa., assignors to Sprague Electric Company, North Adams, Mass.

Filed Dec. 5, 1988, Ser. No. 279,740
Int. Cl.[4] H01G *4/10, 4/12*
U.S. Cl. 361—321 **18 Claims**

8. A ceramic substrate comprising a sintered ceramic body that is comprised of from 95 to 99 weight percent of a high-firing polycrystalline magnesium barium zinc titanate, wherein

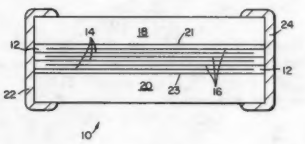
by molar quantities said barium and said zinc amount to from 40 to 60% of said magnesium, and from 1 to 5 weight percent of a sintering flux.

4,882,651

MONOLITHIC COMPOUND-CERAMIC CAPACITOR

Galeb H. Maher, North Adams, Mass., assignor to Sprague Electric Company, North Adams, Mass.

Filed Dec. 5, 1988, Ser. No. 279,739
Int. Cl.[4] H01G *4/10, 4/42, 7/00*
U.S. Cl. 361—321 **12 Claims**



1. A monolithic ceramic capacitor comprising:

(a) one layer comprising a mature polycrystalline ceramic having a narrow and homogenous distribution of grain sizes;

(b) a stack of at least two spaced-apart conductive film electrodes buried in said one layer; and

(c) two outer layers comprising a mature polycrystalline ceramic, each of said two layers located on opposite surfaces of said one layer and being co-reacted and bonded thereto, said ceramic of said two layers having a distinctly broader and less homogenous distribution of grain sizes than that of said one-layer ceramic.

4,882,652

HIGH DIELECTRIC CONSTANT TYPE CERAMIC COMPOSITION

Osamu Furukawa, Sagamihara; Mitsuo Harata; Takaaki Yasumoto, both of Kawasaki, and Motomasa Imai, Inagi, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

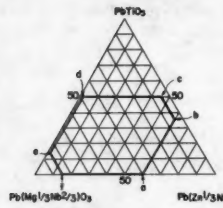
Continuation-in-part of Ser. No. 791,060, Oct. 24, 1985, abandoned. This application Nov. 2, 1987, Ser. No. 115,908
Claims priority, application Japan, Nov. 4, 1986, 61-260814
Int. Cl.[4] C04B *35/46*
U.S. Cl. 361—321 **11 Claims**

1. A high dielectric constant ceramic composition, characterized in that said composition is represented by the general formula:

$$xPb(Zn_{\frac{1}{3}}Nb_{\frac{2}{3}})O_3-$$

$$yPb(Mg_{\frac{1}{3}}Nb_{\frac{2}{3}})O_3-zPbTiO_3,$$

wherein a portion of Pb of the composition within lines connecting the following points a, b, c, d, e' and f' of a ternary composition diagram having the following apexes of respective components, is substituted by from 2 to 30 mole % of calcium:



a:	(x = 0.60,	y = 0.40,	z = 0.00)
b:	(x = 0.60,	y = 0.05,	z = 0.35)
c:	(x = 0.45,	y = 0.05,	z = 0.50)
d:	(x = 0.01,	y = 0.49,	z = 0.50)
e'	(x = 0.01,	y = 0.8,	z = 0.19)
f'	(x = 0.5,	y = 0.5,	z = 0)

4,882,653

CAPACITOR

Motoyuki Suzuki, Kyoto, and Yukichi Deguchi, Otsu, both of Japan, assignors to Toray Industries, Tokyo, Japan

Filed Feb. 16, 1989, Ser. No. 312,004
Claims priority, application Japan, Feb. 18, 1988, 63-36374
Int. Cl.[4] H01G 4/08
U.S. Cl. 361—323 7 Claims

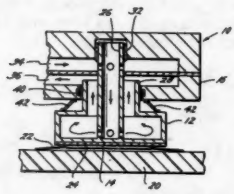
1. A capacitor comprising an aluminum thin layer as an electrode and a polyphenylene sulfide film as at least a portion of dielectric material, in which the ratio of the number of atoms of sulfur to the number of atoms of aluminum at the surface of the aluminum thin layer is not more than 0.14.

4,882,654

METHOD AND APPARATUS FOR ADJUSTABLY MOUNTING A HEAT EXCHANGER FOR AN ELECTRONIC COMPONENT

Richard D. Nelson, Austin, Tex.; Omkarnath R. Gupta, Englewood, Colo., and Dennis J. Herrell, Austin, Tex., assignors to Microelectronics and Computer Technology Corporation, Austin, Tex.

Filed Dec. 22, 1988, Ser. No. 288,363
Int. Cl.[4] H01L 23/34
U.S. Cl. 361—382 13 Claims



1. An adjustably mounted heat exchanger for mating with an electronic component comprising,

a fluid heat exchanger for mating with an electronic component, said heat exchanger having a fluid inlet and fluid outlet,

a fixed support,

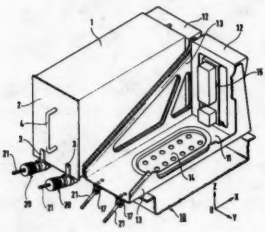
connecting support means between the fixed support and the heat exchanger for supporting the fluid heat exchanger from the fixed support, said connecting support means initially being flexible for adjusting the position of the heat exchanger relative to the electronic component and thereafter being rigid for fixedly supporting the heat exchanger.

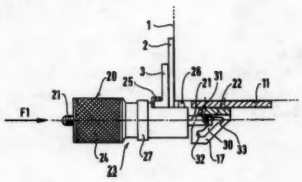
4,882,655

DEVICE FOR LOCKING AN ELECTRONIC EQUIPMENT HOUSING ON A TRAY

Denis Pavie, Ballancourt Sur Essonne, France, assignor to Societe Anonyme dite: VIBRACHOC, Evry Cedex, France

Filed Apr. 20, 1988, Ser. No. 183,960
Claims priority, application France, Apr. 22, 1987, 87 05672
Int. Cl.[4] H05K 7/16
U.S. Cl. 361—391 7 Claims





1. A device for locking an electronic equipment housing having a vertical front wall on a tray, said device comprising a moving carriage adapted to be connected to the front wall of the housing, a threaded shaft along which the carriage moves, a hinge pin fixed perpendicularly to one of the ends of the threaded shaft, and a fork disposed beneath the tray and provided with two parallel inclined slots which extend downwardly and forwardly towards said front wall, in which the hinge pin is displaced, wherein each slot includes at least one stop notch at at least one end thereof projecting at an angle to said slot and holding fast the hinge pin of the threaded shaft.

4,882,656

SURFACE MOUNTED DECOUPLING CAPACITOR

L. William Menzies, Jr., 938 Pleasant Hill Rd., Redwood City, Calif. 94061, and Stephen W. Menzies, 4906 Colusa St., Union City, Calif. 94587

Continuation-in-part of Ser. No. 941,454, Dec. 12, 1986, Pat. No. 4,779,164. This application Oct. 14, 1988, Ser. No. 258,242
The portion of the term of this patent subsequent to Oct. 18, 2005, has been disclaimed.
Int. Cl.[4] H05K 7/10
U.S. Cl. 361—393 6 Claims

1. In combination, a printed circuit board having a series of sockets, including at least one dedicated power socket and at least one dedicated ground socket and a surface mountable decoupling capacitor assembly, said assembly comprising:

an insulative substrate;

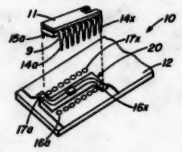
at least one pair of hollow insertable contacts connected to and extending through said substrate, each pair of said contacts being spaced being spaced from each other a

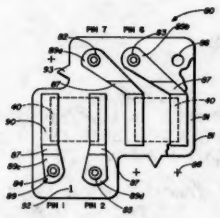
distance representative of a distance between said at least one power socket and said at least one ground socket of said printed circuit board;

at least one decoupling capacitor mounted on said substrate, each capacitor of said at least one capacitor having internal stacked interdigitated plates and opposed conductive sideplates connecting alternate ones of said stacked plates;

a conductive pathway on a surface of said substrate extending from each one of said opposed conductive sideplates to one of said hollow insertable contacts of each of said at least one pair of contacts, and

means connecting said pathways to said conductive side-





plate, said assembly being insertable into said printed circuit board under a multi-lead pin integrated circuit package positioned on said printed circuit board or on a wave-solderable surface of said printed circuit board such that only one or more power lead pins and one or more ground lead pins of said integrated circuit package pass into electrical contact with respective ones of said at least one pair of contacts to interconnect with respective ones of said at least one power socket and said at least one ground socket of said printed circuit board, remaining ones of said lead pins being inserted into the remainder of said series of sockets of said printed circuit board without electrical connection with said conductive pathways.

4,882,657

PIN GRID ARRAY ASSEMBLY

Randall E. Braun, Santa Cruz, Calif., assignor to ICI Array Technology, Inc., San Jose, Calif.

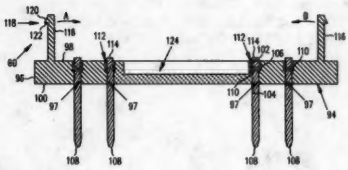
Filed Apr. 6, 1988, Ser. No. 178,109
Int. Cl.[4] H05K *1/00*
U.S. Cl. 361—412 **8 Claims**

1. A pin grid array assembly comprising:

a base on which an electrical component such as a semiconductor device may be mounted;

a first conductive member fixed to said base and connectable to such a mounted electrical component;

a pin grid array including a body having a plurality of pins therein, the body being mountable to the base; and



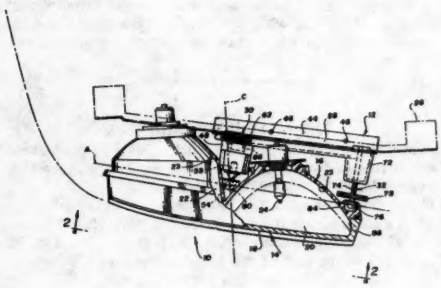
a second conductive member which is resilient for providing connection between a pin and the first conductive member when the body is mounted to the base.

4,882,658

HEADLAMP ASSEMBLY

Alfred M. Allen, Palm Harbor, Fla., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 29, 1988, Ser. No. 237,802
Int. Cl.[4] B60Q *1/00*
U.S. Cl. 362—61 **6 Claims**



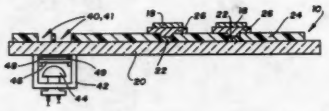
1. A headlamp assembly adapted to be mounted on the front end of a motor vehicle and having a lamp body for selective adjustment about an aim axis, said headlamp assembly including a mounting bracket adapted to be fixedly secured to said front end of said motor vehicle, said mounting bracket supporting a longitudinally adjustable ball pivot connected to said lamp body along said aim axis and movable along a first axis substantially perpendicular to a vertical plane passing through said aim axis, a fixed ball pivot supported by said bracket and connected to said lamp body and located above said longitudinally adjustable ball pivot, said longitudinally adjustable ball pivot having a threaded shaft fixed thereto, a drive spur gear mounted on said bracket to the rear of said fixed ball pivot for rotation about a second axis vertically spaced from and substantially parallel to said first axis, a driven spur gear connected to said shaft of said adjustable ball pivot so as to cause longitudinal movement of the latter along said first axis upon rotation of said driven gear, means connecting said drive gear to said driven gear so that rotation of said drive gear causes rotation of said driven gear with resultant movement of said lamp body about said aim axis.

4,882,659

VACUUM FLUORESCENT DISPLAY HAVING INTEGRAL BACKLIT GRAPHIC PATTERNS

Jeffrey M. Gloudemans, Kokomo, Ind., assignor to Delco Electronics Corporation, Kokomo, Ind.

Filed Dec. 21, 1988, Ser. No. 287,208
Int. Cl.[4] F21V *9/16*; G01D *11/28*; B60Q *1/54*
U.S. Cl. 362—61 5 Claims



5. A motor vehicle instrument panel housing including a vacuum fluorescent display mounted in the housing and adapted to be viewed by a vehicle occupant, the display having a transparent glass substrate, a phosphored anode conductor supported on a front surface between the substrate and the occupant for emitting light when bombarded with charged electrical particles, and a layer of substantially opaque insulating material covering the remainder of such front surface, the improvement wherein:

a patterned opening is provided in the insulation layer adjacent the phosphored anode conductor;

the housing includes an open-ended cavity engaging a back surface of the display substrate adjacent to said patterned opening to form a substantially closed backlighting cavity; and

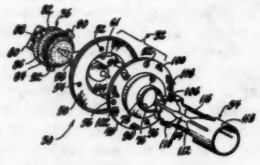
the backlighting cavity is illuminated by a light source mounted therein such that the light of said source is transmitted through the substrate and patterned opening, thereby to define an emissive image in the shape of said patterned opening which image appears to the occupant in substantially the same plane as that of the phosphored anode.

4,882,660

HEADLAMP ASSEMBLY

Martin K. Liverance, Royal Oak, Mich.; David R. McMahan, and Bartly A. Haydu, both of Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 185,209, Apr. 18, 1988, abandoned, which is a continuation of Ser. No. 930,741, Nov. 13, 1986, Pat. No. 4,747,029. This application Nov. 28, 1988, Ser. No. 276,608
The portion of the term of this patent subsequent to May 24, 2005, has been disclaimed.
Int. Cl.[4] H01R *33/00*
U.S. Cl. 362—226 12 Claims



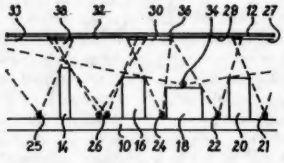
1. In combination, a vehicle headlamp assembly including a reflector formed with a pair of side-by-side cavities each of which has a parabolic reflecting surface and a circular opening formed in each of said reflecting surfaces and adapted to receive the light bulb of a replaceable light bulb assembly from the rear of said reflector, a retainer located at the rear of said reflector and forming a permanent part thereof for positioning said light bulb assembly in a predetermined position relative to said opening, and a replaceable light bulb assembly having a lamp bulb smaller in diameter than said opening and having a collar formed with three circumferentially spaced retainer members projecting radially outwardly therefrom, said retainer having three access slots formed therein for selectively receiving said three retainer members of said replaceable bulb assembly, said retainer including an inner member and an outer member defining a ring-like cavity with an axial dimension sufficient to accommodate said retainer members on said light bulb assembly, one of said inner and outer members having a stop, said access slots upon receiving said retainer members of said light bulb assembly permitting said collar and said retainer members to move into said ring-like cavity from the rear thereof after which said light bulb assembly is rotatable into engagement with said stop to orient said light bulb assembly rotationally with respect to said reflector, and spring means in said ring-like cavity continuously engaging and pressing said retainer members inwardly towards said opening when said light bulb assembly is rotated to orient said light bulb axially with respect to said reflector.

4,882,661

PROCESS FOR THE ENHANCEMENT OF LIGHT STRUCTURES AND LIGHT INSTRUMENT

Annick Arnaud, 23, rue de Pontoise, F-95160 Montmorency, France

PCT No. PCT/FR87/00343, § 371 Date May 2, 1988, § 102(e) Date May 2, 1988, PCT Pub. No. WO88/01709, PCT Pub. Date Mar. 10, 1988
PCT Filed Sep. 3, 1987, Ser. No. 194,987
Claims priority, application France, Sep. 4, 1986, 86 12442
Int. Cl.[4] F21V *13/00*
U.S. Cl. 362—242 8 Claims



1. A process for forming a changing light display to be viewed by an observer comprising the steps of:

providing a static composition having an extended surface and which is transparent or translucent;

projecting light onto respective effective zones of the extended surface from a plurality of extended light means, the light means all being mounted immovably relative to the static composition and on a side of the extended surface opposite to the observer,

said projecting step including projecting light onto a plurality of respective partial effective zones which are only respective small parts of the extended surface from respective partial light sources of the light means, and projecting light onto a background effective zone which is substantially all of the extended surface from a background light source of a single color of the light means, and

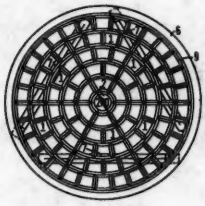
varying, progressively and independently, an intensity of each of the light means.

4,882,662

GRID OF LAMELLAE FOR A LAMP

Peter Prodell, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Dec. 24, 1987, Ser. No. 137,603
Claims priority, application Fed. Rep. of Germany, Feb. 17, 1987, 3705020
Int. Cl.[4] F21V *11/06*
U.S. Cl. 362—290 14 Claims



1. A lighting fixture for integration in ceilings, attachment to ceilings and suspended from ceilings, having a box-shaped housing, a grid of lamellae having at least approximately double-parabolic cross-section connected lattice-like to one another and inserted into alight exit opening and which, for the lowest possible masking losses of light of light bulbs arranged above the grid in the housing, produces the shielding desired in accord with the respective demands of a workplace comprising:

for a center-symmetrical light exit opening, a center-symmetrical grid composed of segments of identical size having a segment angle alpha of 360/n degrees, where n is a whole, positive number; and with reference to an annular center grid cell having a diameter 2 Ro which optimally meets the desired masking condition given the lowest possible masking losses, a framing-cell-like subdivision of the segments is provided such that, while preserving the center symmetry of the grid, the framing cells do not exceed the value 2 Ro in their dimensions either in a diagonal either in the largest, straight framing side, either, respectively, in the chord of the largest, arcuate framing side, the surface area dimensions of the framing cells being optimally large and optimally identical with reference to the value 2 Ro;

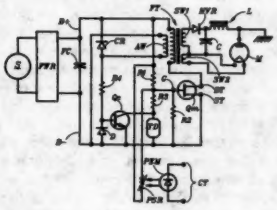
wherein the dimension of the light opening determines the framing-cell-like subdivision of the segments to produce framing cells whose diagonals and whose largest, straight framing side or, respectively, chord length of the largest, arcuate frame side significantly fall below the value 2 Ro, with reference to a segment of the grid having a lamellae union yielding a self-contained framing cell structure, a lamellae shortened in height is provided between two lamellae of identical height following one another which proceed perpendicular to the radial direction or perpendicular to the circumferential direction, leaving the principle radial lamellae out of consideration, whereby all intermediate lamellae proceeding in radial direction and adjacent to a shortened connecting lamellae connecting the two principle radial lamellae to one another are likewise shortened; these shortened lamellae having their free, narrow ends at a head side arranged above the plane that is defined by the free, narrow ends at the head side of the remaining lamellae of the lamella assembly.

4,882,663

MOSFET FLYBACK CONVERTER

Ole K. Nilssen, Caesar Dr., Rte. 5, Barrington, Ill. 60010

Continuation of Ser. No. 812,721, Dec. 23, 1985, abandoned.
This application Apr. 10, 1989, Ser. No. 338,513
Int. Cl.[4] H02M *3/338*
U.S. Cl. 363—19 12 Claims



1. Converter means adapted to convert a DC voltage to an alternating voltage, comprising:

transformer means having a primary winding;

switch means having a pair of switched terminals and a pair of control terminals, the switch means being operative to permit relatively unimpeded flow of current between the switched terminals, but only as long as: (i) a control voltage is applied between its control terminals, and (ii) the magnitude of this control voltage exceeds a minimum level, this minimum level being approximately proportional to the magnitude of the current flowing between the switched terminals;

connect means operative to connect the primary winding and the switched terminals in circuit with the DC voltage in such manner that, as long as the switch means is operative to permit relatively unimpeded flow of current between its switched terminals, the DC voltage is effectively applied across this primary winding; and

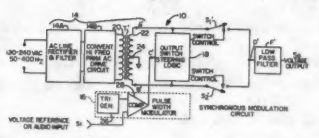
control means connected with the control terminals and operative to provide a control voltage having a periodically varying magnitude that, whenever current is flowing between the switched terminals, is: (i) substantially proportional to the magnitude of this current, and (ii) in excess of said minimum level.

4,882,664

SYNCHRONOUS MODULATION CIRCUIT

Terris L. Pennington, Edmonds, Wash., assignor to Rane Corporation, Everett, Wash.

Filed Jun. 8, 1988, Ser. No. 204,033
Int. Cl.[4] H02M *1/12*
U.S. Cl. 363—41 7 Claims



1. Synchronous modulation circuit, comprising:

input means for receiving an input signal;

output means for producing an electrical output signal;

alternating current source means having a transformer including first and second terminals at a secondary winding and producing opposite phase alternating current power signals at said terminals;

pulse width modulation means for producing a sequence of variable width pulses, said pulse width modulation means

being connected to said input means for varying the width of said pulses in accordance with the input signal;

output switching means for selectively connecting said first and second terminals to said output means; and

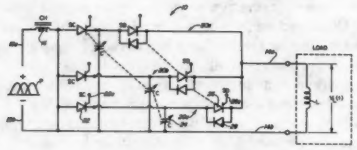
steering logic means including logic gates having inputs connected to said first and second terminals of said alternating current source means and to said pulse width modulation means, and having a control output connected to said output switching means, said steering logic means being responsive to the combined instantaneous logic states of signals at said first and second terminals and to an instantaneous logic state of said variable width pulses from said pulse width modulation means to cause said output control to operate said output switching means to connect said first terminal to said output means when logic signals at said first terminal and at an output of said pulse width modulation means are of the same logic state, and to connect said second terminal to said output means when logic signals at said second terminal and at said output of said pulse width modulation means are of the same logic state so as to deliver a variable amount of power to said output means in accordance with variation of the input signal.

4,882,665

HIGH FREQUENCY, HIGH POWER, POWER SUPPLY

Keh-Kun Choi, 60-100 H01-K1-Dong, Tongdaemun-Gu Seoul, 131, Rep. of Korea, and Hyeong I. Choi, 5431 NE. River Rd., Chicago, Ill. 60656

Filed Jun. 10, 1988, Ser. No. 205,236
Int. Cl.[4] H02M *7/00*
U.S. Cl. 363—60 **36 Claims**



1. A multi-branch power supply usable with an exterior source of electrical energy for supplying energy, substantially without a dc component to a load comprising:

a first power supplying branch with,

first branch charging means having a first state and a second state;

first means, coupled to said first branch charging means, for storing, with a first polarity, energy received from the source of electrical energy when said first charging means is in said first state;

first branch discharging means having a first state and a second state and coupled between said first storage means and the load for providing energy stored with said first polarity at said first storage means to the load when said first branch discharging means is in said first state;

a second power supplying branch with,

second branch charging means having a first state and a second state;

second means, coupled to said second branch charging means, for storing, with a second polarity, energy received from the source of electrical energy when said second charging means is in said first state;

second branch discharging means having a first state and a second state and coupled between said second storage means and the load for providing energy stored with said second polarity at said second storage means to the load when said second branch discharging means is in said first state; and

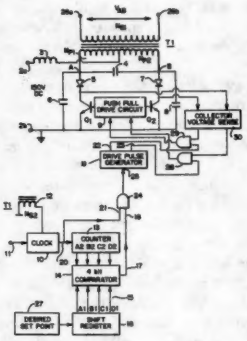
control means, coupled to said first branch charging and discharging means, for switching said first charging means to said first state, with said first discharging means in said second state, to store energy at said first storage means with said first polarity during a first time interval and including means for subsequently switching, during a second time interval, said first discharging means to said first state, with said charging means in said second state, to transfer a substantial portion of the stored energy from said first storage means to the load with said first polarity during said second time interval with said first time interval preceding said second time interval including means, coupled to said second branch charging and discharging means, for switching said second charging means to said first state, with said second discharging means in said second state to store energy at said second storage means with said second polarity during a third time interval and including means for subsequently switching, during a fourth time interval, said second discharging means to said first state, with said second charging means in said second state, to transfer a substantial portion of the stored energy from said second storage means to the load with said second polarity during said fourth time interval with said third time interval preceding said fourth time interval.

4,882,666

HIGH FREQUENCY HIGH VOLTAGE POWER SUPPLY WITH CONTROLLED OUTPUT POWER

Gert W. Bruning, Tuckahoe, and Edward H. Stupp, Spring Valley, both of N.Y., assignors to North American Philips Corporation, New York, N.Y.

Filed Mar. 23, 1989, Ser. No. 328,377
Int. Cl.[4] H02P *13/18*; H02M *3/337*
U.S. Cl. 363—97 **9 Claims**



1. A power supply circuit with control of the output power comprising:

a push-pull oscillator circuit including first and second switching transistors coupled to a parallel resonant LC tank circuit comprising a primary winding of a transformer coupled in parallel with a capacitor,

a push-pull driver having first and second outputs coupled to respective control electrodes of the first and second switching transistors to supply thereto drive pulses approximately 180° out of phase, and

a drive circuit including a secondary winding of said transformer for supplying the drive pulses to said push-pull driver, said drive circuit further comprising; a source of clock pulses controlled by said secondary winding, a digital set point device for setting a desired output power level of the power supply circuit, and a comparison device coupled to said clock pulse source and said digital set point device for enabling and disabling the supply of drive pulses to the push-pull driver as a function of the setting of said digital set point device whereby in a given time inter-

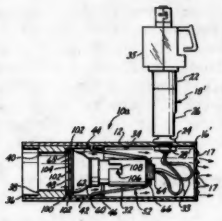
val the oscillator circuit is allowed to self-oscillate for a number of cycles of the output voltage as determined by said setting.

4,882,667

VENTILATED MINIATURE LIGHTING FIXTURES

Maer Skegin, 1411 N. Poinsettia Pl., #206, Los Angeles, Calif. 90046

Filed May 20, 1988, Ser. No. 196,287
Int. Cl.[4] F21V *29/00*
U.S. Cl. 362—373 **18 Claims**



1. In a lighting fixture of the type having a housing, a lamp socket in said housing, a reflector supported on said socket for directing light emitted by a lamp fitted in said socket, and a front baffle on said housing in contact with said reflector, the improvement comprising:

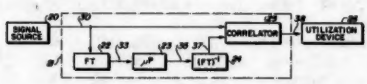
spacer means interposed between said baffle and said reflector for maintaining an air flow gap therebetween for ventilating the interior of said housing.

4,882,668

ADAPTIVE MATCHED FILTER

Hans-Peter Schmid, Upland, and Richard S. Schlunt, Loma Linda, all of Calif., assignors to General Dynamics Corp., Pomona Division, Pomona, Calif.

Filed Dec. 10, 1987, Ser. No. 131,065
Int. Cl.[4] G06F *15/336*
U.S. Cl. 364—600 **9 Claims**



1. An adaptive matched filter which enhances the signal-to-noise power ratio of signals applied to, and processed by, the adaptive matched filter, said filter comprising:

first means responsive to signals applied to said adaptive matched filter, the signals comprising known signals and noise signals, where the first means functions to provide signals that represent the Fourier transform of the signals applied to the adaptive matched filter and where the first means also functions to provide first output signals which are indicative of the noise power spectral density of signals that represent the Fourier transform of the signals applied to the adaptive matched filter means;

second means coupled to said first means, where the second means functions to provide signals which are derived from said first output signals and stored signals which are indicative of said known signals and where the second means also functions to provide second output signals which are indicative of the transfer function of the adaptive matched filter;

third means coupled to said second means to receive said second output signals, where the third means functions to provide third output signals that represent the inverse Fourier transform of said second output signals; and

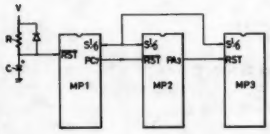
fourth means coupled to said third means, where the fourth means functions to combine the signals applied to the adaptive matched filter with said third output signals in a manner which filters the signals applied to the adaptive matched filter to substantially remove the noise signals therefrom, and where the fourth means also functions to provide output signals from the adaptive matched filter in which the signal-to-noise power ratio is enhanced.

4,882,669

MULTI COMPUTER FAIL SAFE CONTROL APPARATUS

Makoto Miura, Hino; Kazuki Miyamoto, and Masato Ishida, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 674,849, Nov. 26, 1984, abandoned.
This application Dec. 9, 1987, Ser. No. 131,267
Claims priority, application Japan, Nov. 28, 1983, 58-223542; Nov. 28, 1983, 58-223543; Nov. 28, 1983, 58-223544; Nov. 28, 1983, 58-223545
Int. Cl.[4] G06F *11/00*
U.S. Cl. 364—184 **4 Claims**



1. A control apparatus comprising:

a first microcomputer;

a second microcomputer; and

a third microcomputer;

wherein said first microcomputer is reset in response to power being supplied to said control apparatus, and then outputs a reset signal for resetting said second microcomputer while starting a control operation, and then during the control operation, when said first microcomputer detects an abnormality of said second microcomputer, said first microcomputer outputs a reset signal for resetting said second microcomputer while continuing the control operation, and

wherein said second microcomputer is reset in response to the reset signal from said first microcomputer, and then outputs a reset signal for resetting said third microcomputer while starting a control operation, and then during the control operation, when said second microcomputer detects an abnormality of said third microcomputer, said second microcomputer outputs a reset signal for resetting said third microcomputer while continuing the control operation.

4,882,670

NUMERICAL CONTROL SYSTEM

Shinichi Isobe; Mitsuto Miyata, and Takashi Yamauchi, all of Tokyo, Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP86/00432, § 371 Date Apr. 20, 1987, § 102(e) Date Apr. 20, 1987, PCT Pub. No. WO87/01215, PCT Pub. Date Feb. 26, 1987
PCT Filed Aug. 21, 1986, Ser. No. 49,692
Claims priority, application Japan, Aug. 21, 1985, 60-183563
Int. Cl.[4] G06F *15/16, 15/46*
U.S. Cl. 364—188 **2 Claims**

1. A numerical control system, comprising:

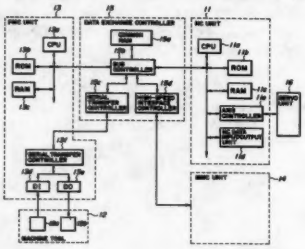
an NC unit;

a programmable machine controller for executing at least sequence control based on signals from the NC unit and a machine tool;

a computerized man-machine interface controller having at least a computer, a CRT connected to the computer and a keyboard connected to the computer; and

a data exchange controller connected to said NC unit, said machine controller and the computer of said interface controller, and data being exchanged among the NC unit, programmable machine contoller and man-machine interface controller under the control of said data exchange controller;

wherein both said NC unit and said programmable machine controller include computers; and



wherein said machine controller includes a bus, said NC unit includes a bus, and said data exchange controller has a common RAM, a high-speed interface controller, and a bus controller connected, for bidirectional data exchange with said common RA, said high-speed interface controller, the bus of said programmable machine controller, and the bus of said NC unit; and said man-machine interface controller having a high-speed interface controller connected to the high-speed interface controller of the data exchange controller and connected to the computer of said interface controller.

4,882,671

MICROPROCESSOR CONTROLLED RIGID DISK FILE SUBSYSTEM

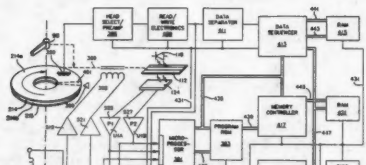
Randolph H. Graham, Fremont; Bruce R. Peterson, San Jose, and Richard J. Blackborow, Cupertino, all of Calif., assignors to Plus Development Corporation, Milpitas, Calif.

Continuation of Ser. No. 741,588, Jun. 4, 1985, Pat. No. 4,819,153. This application Mar. 27, 1989, Ser. No. 329,400

The portion of the term of this patent subsequent to Apr. 4, 2006, has been disclaimed.

Int. Cl.[4] G06F *1/00*; G11B *5/012*

U.S. Cl. 364—200 **17 Claims**



1. An improved control system for a miniature disk file subsystem including a head and disk assembly for storing and retrieving user data, the subsystem having electrical connection paths to address, data, and control buses of a host computer, the control system being mechanically attached to the head and disk assembly and in electrical interconnection therewith, the control system comprising:

control means including at least one servo loop for controlling the position of a head positioning mechanism of said assembly relative to at least one rotating data storage disk of said assembly having a diameter not substantially greater than 95 millimeters in order to cause a data head of said mechanism to move to a commanded track of a multiplicity of available concentric data tracks formed on a data storage surface of said disk during track seeking operations and to cause said head to remain in substantial alignment with said commanded track during track following operations;

controller/interface means including interface means for receiving commands and data to be stored from said host computer directly via the connection paths to at least one of its said address, data and control buses and for sending the commands to a single microprocessor and for sending the data to be stored to a buffer memory and for returning subsystem status values from the single microprocessor and for returning the data retrieved from the disk to the host computer, further including memory controller means for generating byte addresses for the buffer memory to enable data to be written into the buffer memory and read out thereof, and data sequencer state machine means for controlling the sequencing of storage and retrieval of data between said surface and said buffer memory via said head,

the single programmed control microprocessor of the subsystem being operatively connected to said control means and to said controller/interface means for operatively controlling user data storage to disk and retrieval from disk operations of said subsystem via said control means and host to disk data transfer operations of said control-/interface means in response to said commands received from said host computer via said controller/interface and for generating and putting out said subsystem status values for said host computer via said controller/interface means.

4,882,672

SYSTEM FOR INITIALIZATION OF CHANNEL CONTROLLERS UTILIZING ADDRESS POINTERS CALCULATED FROM MULTIPLYING SIZES OF DATA FIELDS WITH DEVICE NUMBERS

Kenji Yahiro, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 99,719, Sep. 22, 1987, abandoned. This application Apr. 13, 1989, Ser. No. 338,380

Claims priority, application Japan, Sep. 22, 1986, 61-224637

Int. Cl.[4] G06F *13/12, 9/34, 12/00, 12/10*

U.S. Cl. 364—200 **2 Claims**

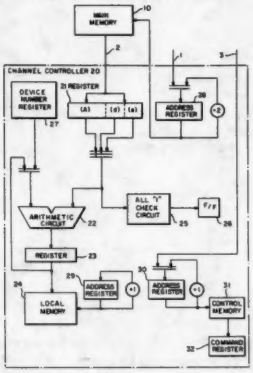
1. A method for initializing a set of channel controllers in an information processing system by writing address pointers of a particular one of a plurality of control data areas assigned to one of the channel controllers into a respective local memory of each of said channel controllers, the method including steps of:

i. storing in a main memory of said information processing system initialization data which is composed of base addresses of control data areas, sizes of data fields of said control data areas, offsets of data fields of said control data areas from said base addresses, and data indicating end of initialization;

ii. each of said channel controllers sequentially reading said initialization data stored in said main memory;

iii. calculating the address pointers assigned to one of the channel controllers by utilizing a predetermined procedure from said initialization data read by said one of the channel controllers and a device number relating to said one of the channel controllers, said predetermined procedure including multiplying said sizes of data fields of said control data areas by said device number;

iv. writing the address pointers assigned to said one of the channel controllers, based on a result of said calculating step, into said local memory of said one of the channel controllers;



v. accessing said main memory by utilizing the address pointers written into said local memory; and

vi. terminating the initialization of said one of the channel controllers upon reading said data indicating the end of the initialization in said sequential reading step.

4,882,673

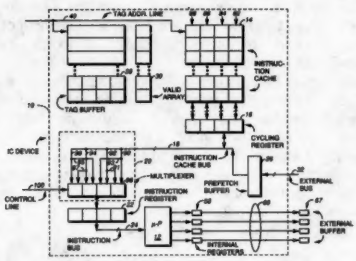
METHOD AND APPARATUS FOR TESTING AN INTEGRATED CIRCUIT INCLUDING A MICROPROCESSOR AND AN INSTRUCTION CACHE

David B. Witt, Austin, Tex., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Oct. 2, 1987, Ser. No. 104,314

Int. Cl.[4] G11C *29/00;* **G01R** *31/28;* **G06F** *11/26, 1/00*

U.S. Cl. 364—200 **16 Claims**



13. An integrated electronic circuit comprising:

a microprocessor for executing respective instructions;

wherein at least one of the respective instructions includes at least one opcode byte in a first byte position and includes at least one data byte in a second byte position;

an instruction cache for storing at least one respective opcode byte and at least one respective data byte of the at least one instruction;

wherein said instruction cache, alternatively, can store the at least one opcode byte in the first byte position with the at least one data byte in the second byte position or can store the at least one opcode byte in the second byte position with the at least one data byte in the first byte position;

instruction bus means for transferring the at least one opcode byte and the at least one data byte between said microprocessor and said instruction cache; and

means for exchanging respective byte positions of the at least one opcode byte and the at least one data byte in the course of a transfer of the at least one opcode byte and the at least one data byte between said microprocessor and said instruction cache.

4,882,674

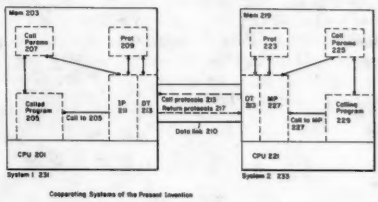
APPARATUS AND METHOD FOR CONTROL OF ONE COMPUTER SYSTEM BY ANOTHER COMPUTER SYSTEM

Jeanne M. Quint, Manchester, and Isabel B. Tomaszewski, Merrimack, both of N.H., assignors to Wang Laboratories, Inc., Lowell, Mass.

Continuation of Ser. No. 708,327, Mar. 5, 1985, abandoned. This application Mar. 9, 1988, Ser. No. 166,838

Int. Cl.[4] G06F *15/16*

U.S. Cl. 364—200 **10 Claims**



Cooperating Systems of the Present Invention

1. In a digital data processing system which has a destination data processing means coupled by message transport means to a source data processing means and wherein the source data processing means has remote call providing means for providing a remote call to a callable program in the destination data processing means and the destination data processing means has remote call receiving means for receiving the remote call and performing a call to the callable program,

a call message which is produced by the remote call providing means in the source data processing means, transferred via the message transport means to the destination data processing means, and received by the remote call receiving means comprising: a callable program specifier for specifying the callable program; and

an optional data part containing one or more optional items representing parameter values, the parameter values not being required in every call to the callable program but being used by the remote call receiving means in making the call when the optional items representing the parameter values are present in the call message.

4,882,675

PAPERLESS SYSTEM FOR DISTRIBUTING, REDEEMING AND CLEARING MERCHANDISE COUPONS

Steven Nichtberger, New Rochelle; Kevin McGlynn, Yorktown Heights, both of N.Y., and Corey Snook, Huntington Beach, Calif., assignors to Steven Nichtberger, New Rochelle, N.Y.

Filed Nov. 26, 1984, Ser. No. 674,847

Int. Cl.[4] G06F *7/04, 15/21;* **G07F** *7/00, 7/08*

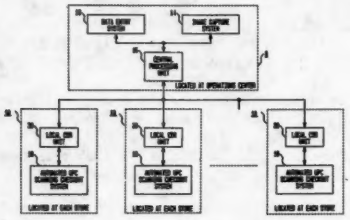
U.S. Cl. 364—401 **25 Claims**

1. A paperless system for distributing and redeeming coupons and the like, said apparatus comprising

display, selection and recording means for presenting to a customer a display of coupons, for enabling the customer to make a selection of coupons from the display, and for recording the selection, said display, selection and recording means further including means for generating a first

signal identifying the customer and his/her coupon selection,

identification and checkout means for identifying the customer at a store checkout station as the one who made the selection and for generating a second signal identifying items purchased in the store by the customer,



matching means coupled to said display, selection and recording means and responsive to said first and second signals for determining any matches between the coupons selected and the items purchased,

and means for crediting the customer in accordance with the terms of the matched coupons.

4,882,676

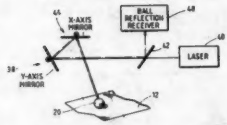
METHOD AND APPARATUS FOR RATING BILLIARD SHOTS AND DISPLAYING OPTIMAL PATHS

Andrew R. Van De Kop, and Franz Van De Kop, both of 925 Fulwar Skipwith, Rte. 3, Baton Rouge, La. 70808

Filed Sep. 9, 1988, Ser. No. 242,159

Int. Cl.[4] G06F *15/44*

U.S. Cl. 364—410 **8 Claims**



1. A billiard ball tracking system, comprising:

a billiards table, cue ball, and object balls;

scanning means for scanning a playing surface of the table to determine positions of the cue ball and the object balls;

position indicating means for indicating an initial position of the cue ball and object balls on the table; and

shot indicating means for indicating a selected shot, the shot indicating means illustrating on the table an ideal path of the cue ball for striking an object ball during the shot.

4,882,677

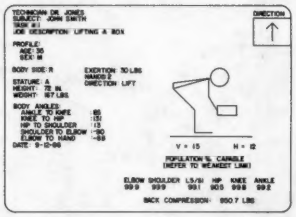
ISOMETRIC STRENGTH TESTING METHOD AND EQUIPMENT FOR DISABILITY EVALUATION

Thomas M. Curran, 464 Springbrook, Saline, Mich. 48176

Filed Sep. 3, 1987, Ser. No. 92,432

Int. Cl.[4] A61B *5/10, 5/22*

U.S. Cl. 364—413.02 **12 Claims**



11. In a disability analysis isometric strength testing system which includes a computer program, an isometric strength testing unit comprising means to support a load sensor, a load sensor on the support means and grip means on the support means connected to the load sensor to enable a subject person to apply an isometric load to the load sensor, means to monitor the load sensor as a function of time and means to record the load applied to the load sensor as a function of time, the steps of, p1 measuring and recording a subject person's height, weight, and sex,

having an unrestrained subject person apply an isometric load to the grip means,

measuring and recording the subject person's actual load exerted, direction of exertion and number of hands from the application of the isometric load,

photographing the subject person during application of the load and digitizing the photograph to measure and record body angles,

calculating the subject person's anthropometric data including body link lengths, centers of gravity and weight from the subject person's height, weight, sex and digitized body angles,

calculating the joint compression for several selected joints of the subject person from the calculated anthropometric data, direction of exertion, number of hands, sex and actual load exerted,

reiteratively recalculating the joint compression at each selected joint by repeatedly adjusting the value of load exerted until the value of joint compression at one of the joints substantially equals a predetermined value to thereby determine an expected load exerted, and

comparing the subject person's expected load exerted to the subject person's actual load exerted to determine the subject person's disability.

4,882,678

DATA SENSING AND PROCESSING DEVICE FOR SCUBA DIVERS

Robert Hollis, San Leandro; John E. Lewis, Rancho Palos Verdes, and Marvin Ackerman, Sunnyvale, all of Calif., assignors to Oceanic USA, San Leandro, Calif.

Filed Jan. 14, 1987, Ser. No. 3,085

Int. Cl.[4] G06G *7/60*

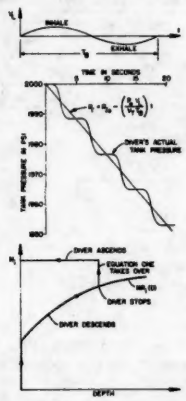
U.S. Cl. 364—413.31 **4 Claims**

1. A portable data sensor, processor, and display mounted in a waterproof case for use by a SCUBA diver using a tank of compressed air and for continuously determining during an underwater dive the allowable remaining dive time for the diver comprising

said data sensor including at least a means for measuring the air pressure in the tank, a means for measuring the ambient

hydrostatic pressure, and a means for measuring time, all of said measuring means mounted in said case and producing data sensor output signals,

said processor including at least a first simulating means responsive to said data sensor output signals and arithmetically combining the same for predicting the dive time remaining at depth that provides for an air reserve following an ascent to the surface, and a second simulating means responsive to said data sensor output signals and for arithmetically combining the same and predicting the dive



time remaining at depth that provides for a direct ascent to the surface without the need for decompression stops, said time predicted by said second simulating means being the no-decompression dive time limit,

said processor including a selection means for determining the allowable remaining dive time which is the lesser of the two dive times predicted by the first and second simulating means, and

means for displaying this allowable remaining dive time on said display.

4,882,679

SYSTEM TO REFORMAT IMAGES FOR THREE-DIMENSIONAL DISPLAY

Heang K. Tuy, Cleveland; Todd J. Krochta, Akron; Frederick C. Mailey, South Euclid, and Hsayjern Lin, Richmond Heights, all of Ohio, assignors to Picker International, Inc., Highland Hts., Ohio

Filed Nov. 27, 1987, Ser. No. 126,368
Int. Cl.[4] G09G *1/06*
U.S. Cl. 364—413.22 **48 Claims**

1. A diagnostic imaging apparatus for forming a three-dimensional representation of a specimen comprising:

acquisition means for acquiring slice data indicative of a physical property of a plurality of generally planar regions of a specimen, each generally planar region being divided into a plurality of subregions represented by subregion data representative of that portion of the slice data unique thereto;

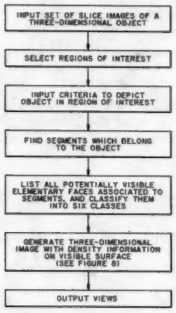
means for assigning a viewing value to subregions of at least one of the planar slices, the viewing value being assigned in accordance with subregion data thereof;

means for segregating at least a first one of the subregions to define a region of interest;

means for defining a boundary of interest within the region of interest;

means for assembling image data representative of subregions of the boundary of interest as a function of subregion data unique thereto;

scaling means for assigning a scaled value to at least a portion of the image data, such that the image data is repre-


INPUT SET OF SLICE IMAGES OF A THREE-DIMENSIONAL OBJECT
SELECT REGIONS OF INTEREST
INPUT CRITERIA TO DEPICT OBJECT IN REGION OF INTEREST
FIND SEGMENTS WHICH BELONG TO THE OBJECT
LIST ALL POTENTIALLY VISIBLE ELEMENTARY FACES ASSOCIATED TO SEGMENTS, AND CLASSIFY THEM INTO SIX CLASSES
GENERATE THREE-DIMENSIONAL IMAGE WITH DENSITY INFORMATION ON VISIBLE SURFACE (SEE FIGURE 8)
OUTPUT VIEWS

sentative of first, second, and third dimensions of an associated specimen; and

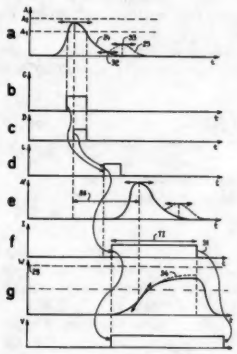
means for projecting the image data onto a viewing surface.

4,882,680

PROCESS AND DEVICE FOR TAKING INTO ACCOUNT LOCATING PULSES SUPPLIED BY A GAMMA CAMERA

Jean-Paul Bonnefoy-Claudet, Grenoble, and Corinne Mestais, Le Prieure Bernin, both of France, assignors to Commissariat a L'Energie Atomique, Paris, France

Filed May 26, 1988, Ser. No. 199,102
Claims priority, application France, May 27, 1987, 87 07479
Int. Cl.[4] G01T *1/164, 1/208*
U.S. Cl. 364—413.24 **13 Claims**



1. A process for taking into account locating pulses supplied by a gamma camera comprising the following steps:

producing scintillations in a scintillation crystal in response to gamma camera radiation,

amplifying said scintillations by means of a plurality of photomultiplier tubes to develop electrical contributions of said tubes,

weighting said electrical contributions successively in resistor arrays,

transmitting said weighted electrical contributions by means of transmission circuits if the maximum amplitude of said scintillations is in a predetermined range,

integrating said weighted and transmitted electrical contributions in integrators to produce integrated pulses,

processing said integrated pulses for producing said locating pulses, and

measuring the energy of said scintillations and validating the taking into account of said locating pulses when the energy of said scintillations belongs in a predetermined energy band.

4,882,681

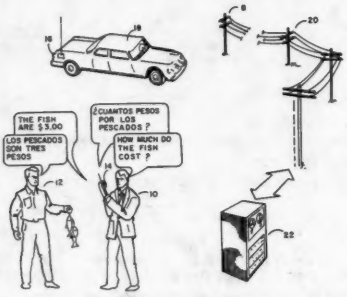
REMOTE LANGUAGE TRANSLATING DEVICE

Gregory R. Brotz, P.O. Box 1322, Sheboygan, Wis. 53081

Filed Sep. 2, 1987, Ser. No. 92,373

Int. Cl.[4] G06F *15/38*

U.S. Cl. 364—419 **4 Claims**



1. A method for contemporaneous language translation at the site of the user and another party comprising the steps of:

providing the user with a transmitter/receiver device;

transmitting a convectional segment of the user's speech by a voice signal through said transmitter/receiver to a speech translation computer;

translating the user's speech into a selected other spoken language form of the other party by said speech translation computer;

broadcasting said translated speech;

receiving back the translated speech by said transmitter/receiver;

broadcasting in verbal form said translated speech to the other party for that other party to comprehend the translation of what the user had originally spoken in a different language;

said transmitter/receiver receiving a conversational segment of the speech of the other party in the other party's foreign language;

transmitting said foreign language over said transmitter/receiver to said speech translation computer;

translating the other party'speech into the user's language;

receiving back of said transmitter/receiver the translation of the other party's foreign language; and

broadcasting in verbal form said translated foreign language to the user whereby the user can listen to the translation and carry on conversations with instantaneous translations at the site of the user and any other party.

4,882,682

APPARATUS FOR DETECTING POSITION OF INTERNAL FAULT OF GAS INSULATED BUS

Koji Takasuka, and Koji Ibuki, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 793,065, Oct. 18, 1985, abandoned. This application May 4, 1988, Ser. No. 190,095

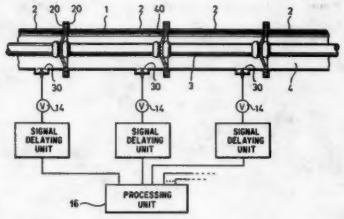
Claims priority, application Japan, Nov. 1, 1984, 59-230840

Int. Cl.[4] G01R *31/08*

U.S. Cl. 364—507 **2 Claims**

1. An apparatus for detecting the position of an internal fault of a gas insulated bus, comprising:

electrodes provided in a tubular-shaped housing of said gas insulated bus, said electrodes positioned at arbitrary intervals from neighboring electrodes along the axial direction of said tubular-shaped housing, said electrodes for detecting a voltage induced within said housing by flashovers and corona discharge within said housing, wherein said electrodes are disc shaped and are mounted in respective cylindrical, gas-tight enclosures extending radially outward from said tubular-shaped housing, sensing surfaces of said electrodes being flush with, but electrically insulated from, an inner surface of said tubular housing;



voltage measurement means which measure said electrode voltages thereat; and

a processing unit responsive to outputs of said measuring means for identifying the position of the fault by comparing outputs from said voltage measurement means.

4,882,683

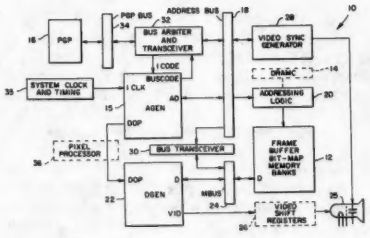
CELLULAR ADDRESSING PERMUTATION BIT MAP RASTER GRAPHICS ARCHITECTURE

Charle'3 R. Rupp, Bolton, and William R. Stronge, Tewksbury, both of Mass., assignors to Fairchild Semiconductor Corporation, Santa Clara, Calif.

Filed Mar. 16, 1987, Ser. No. 26,041

Int. Cl.[4] G09G *1/16*; G06F *3/153*

U.S. Cl. 364—521 **65 Claims**



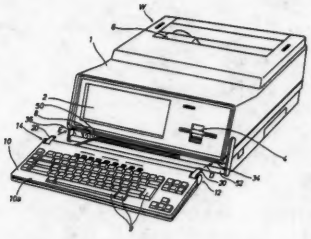
1. A frame buffer address circuit for raster graphics machines having a frame buffer memory comprising a bit map for storing graphics image data at frame buffer memory addresses correlated with pixel positions of a raster display surface, said frame buffer address circuit comprising:

linear permutation network (LPN) means for transformation and linear permutation of the graphics image data frame buffer memory addresses to form a linear permutation bit map in the frame buffer memory addressable by the frame buffer address circuit in at least two different addressing mode cell configurations, at least one of said addressing mode cell configurations corresponding to a two-dimensional cell.

4,882,684
ENGAGING DEVICE OF A KEYBOARD FOR A DATA PROCESSING UNIT

Michifumi Ishigami, and Toyonori Sasaki, both of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Dec. 21, 1987, Ser. No. 135,274
Claims priority, application Japan, Dec. 25, 1986, 61-202229
Int. Cl.[4] G06F *15/00*
U.S. Cl. 364—708 **11 Claims**



1. In combination with a data processing unit having a keyboard detachably mounted on a body of said data processing unit, an engaging device comprising:

engaging means for receiving and holding leg members, said engaging means being formed at a lower front portion of said body of said data processing unit and extending rearwardly into said body;

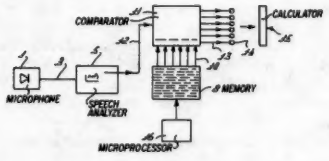
said leg members rotatably mounted relative to said keyboard and lockable into at least one predetermined position and selectively engageable with said engaging means; and

angle adjusting means, connected to said leg members, for rotating said leg members to a predetermined position for adjusting a declination angle between an upper surface of said keyboard and a level surface on which the keyboard rests, thereby allowing an operator to select a plurality of declination angles of the keyboard.

4,882,685
VOICE ACTIVATED COMPACT ELECTRONIC CALCULATOR

Cornelis van der Lely, 7, Brüschenrain, Zug, Switzerland

Continuation of Ser. No. 900,138, Aug. 25, 1986, abandoned.
This application Oct. 17, 1988, Ser. No. 259,424
Claims priority, application Netherlands, Aug. 26, 1985, 8502336; Oct. 30, 1985, 8502959
Int. Cl.[4] G06F *3/16*
U.S. Cl. 364—709.11 **9 Claims**



1. A compact electronic calculator comprising:

a display screen for displaying calculator inputs and outputs;

a microphone for receiving audible inputs consisting of numbers and operative words and converting said audible inputs to electrical signals;

a speech analyzer means coupled to said microphone for converting said electrical signals from said microphone into digital words;

an electronic memory, said electronic memory string digitized words representing said numbers and said operative words;

an electronic comparator means, said comparator means coupled to said speech analyzer for receiving said digital words and for comparing said digital words to digitized words stored in said electronic memory, said electronic memory also being coupled to said comparator means;

a processing means coupled with said electronic memory, said processing means controlling the comparison of each said digital word to said digitized words such that said comparator produces a digital number corresponding to an address location in said electronic memory for a digitized word that matches a digital word generated by said speech analyzer;

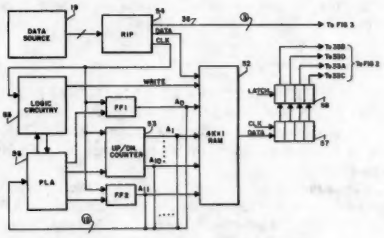
a plurality of simple comparators, said simple comparators being electronically coupled to said electronic comparator means to receive said digital numbers; and

execution means for executing said audible inputs and displaying the result on said display screen, each said simple comparator, upon recognition of a designated digital number actuating said execution means.

4,882,686
PRINTING APPARATUS WITH IMPROVED DATA FORMATTING CIRCUITRY

Steven R. Gretter, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 22, 1987, Ser. No. 64,739
Int. Cl.[4] G06F *3/14*
U.S. Cl. 364—518 **15 Claims**



1. An image recording apparatus comprising:

memory means, including one or more, but less than a first predetermined plural number, N, of integrated circuit memory chips, having at least a second plural predetermined number, M, of memory sites for storing in said chip(s) as a buffer memory image signals representing a full line of image signals to be printed by said apparatus;

means for writing serially the image signals to said memory means in consecutive sequential order;

recording means having said second predetermined number of recording elements and driver means for activating same for recording an image on a recording material on a line by line basis;

shift register assemblage means having the first predetermined number of shift register assemblages, each for storing image signals that are serially inputted into each shift register assemblage and for outputting said image signals in parallel to said driver means;

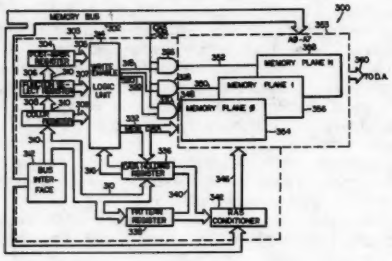
intermediate register means for shifting image signals to each of said shift register assemblages; and

extracting means for extracting from said memory means image signals and for feeding said image signals to said intermediate register means.

4,882,687
PIXEL PROCESSOR

Dorothy A. Gordon, Cambridge, Mass., assignor to Schlumberger Technology Corporation, Houston, Tex.

Filed Mar. 31, 1986, Ser. No. 846,657
Int. Cl.[4] H03K 19/177; G06F 7/50
U.S. Cl. 364—518 16 Claims



1. A method of performing a Boolean OR operation on a function of two independent variables, one of said variables being stored in a first digital storage device which will also contain the result of said Boolean OR operation, the other of said variables being stored in a second digital storage device, the method comprising:

writing a digital "1" into said first digital storage device when the contents of said second digital storage device is a digital "1" without reading the contents of said first digital storage device; and

inhibiting a write cycle of said first digital storage device when the contents of said second digital storage device is a digital "0".

4,882,688
COMPUTER-CONTROLLED METHOD AND APPARATUS FOR MAKING BINGO CARDS

Stanley F. Kondziolka, Markham, and Henry Klein, Thornhill, both of Canada, assignors to Demco Bingo Inc., Thornhill, Canada

Continuation-in-part of Ser. No. 823,187, Jan. 27, 1986, abandoned. This application Dec. 4, 1987, Ser. No. 128,920
Claims priority, application Canada, Dec. 5, 1986, 524687
Int. Cl.[4] G06F 15/44; A63F 3/06
U.S. Cl. 364—519 13 Claims

1. A method for making bingo cards, comprising the steps:

(a) generating a first plurality of random numbers utilizing the random number generating capability of a computer,

(b) formatting on the basis of said first plurality of random numbers a first number combination for a first bingo card, utilizing the electronic processing capability of the said computer and a formatting program,

(c) storing the first number combination for the first bingo card in an electronic or magnetic memory means,

(d) generating a further plurality of random numbers utilizing the said random number generating capability,

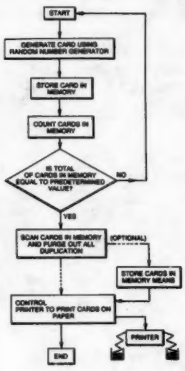
(e) formatting on the basis of said further plurality of random numbers a further number combination for a further bingo card, utilizing the electronic processing capability of the said computer and said formatting program,

(f) storing the further number combination for the further bingo card in the memory means,

(g) repeated steps (d), (e) and (f) in that order until the total of stored number combinations in the memory reaches a predetermined level,

(h) using said electronic processing capability to scan the number combinations in the memory means in order to detect duplicates,

(i) if required, removing number combinations from the memory means in order to eliminate duplication, and

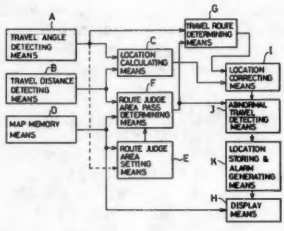


(j) using a computer-controlled, high-speed graphics printer to print bingo cards on paper, utilizing the number combinations remaining in the memory means.

4,882,689
NAVIGATION SYSTEM USING ANGULAR RATE SENSOR

Yoshihito Aoki, Shizuoka, Japan, assignor to Yazaki Corporation, Japan

Filed Feb. 9, 1988, Ser. No. 154,028
Claims priority, application Japan, Feb. 10, 1987, 62-27278
Int. Cl.[4] G06F 15/50
U.S. Cl. 364—449 4 Claims



1. A navigation system for displaying travel locations of a vehicle on a displayed map, comprising:

(a) means for detecting vehicle travel angle;

(b) means for detecting vehicle travel distance;

(c) means coupled to said vehicle travel angle detecting means and said vehicle travel distance detecting means for calculating vehicle locations on the basis of the detected vehicle travel angles and distances;

(d) means for storing map information data including branch points;

(e) means coupled to said map information data storing means for setting a route judge area at each branch point to determine a route along which the vehicle travels from a branch point;

(f) means coupled to said vehicle distance detecting means said map storing means and said route judge area setting means, for determining vehicle passing into the set route judge area (JE) when a distance (Lc) between a current vehicle location (Pa) and a succeeding branch Point (P_1)

becomes shorter than a first predetermined distance and vehicle passing through the set route judge area when a distance (MM) between a position (Pa), at which vehicle enters the set route judge area, and a current vehicle location (Pc) becomes longer than a second predetermined distance;

(g) means coupled to said vehicle travel angle detecting means and said route judge area pass determining means for determining a travel route at each branch point by comparing a travel angle detected by said travel angle detecting means with map data stored in said map data storing means when the vehicle has passed through the set route judge area;

(h) means coupled to said vehicle location calculating means and said travel route determining means, for correcting said calculated vehicle locations (Pn) so as to be located along a road on a displayed map in accordance with expressions;

(i) means coupled to said vehicle location correcting means and said route judge area pass determining means for detecting an abnormal travel when a detected vehicle travel angle exceeds a predetermined angle under the condition that said route judge area pass determining means determines that the vehicle is out of the set route judge area;

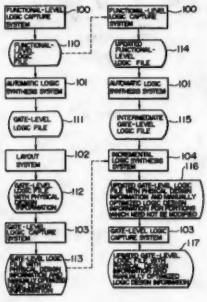
(j) means coupled to said abnormal travel detecting means for storing a current vehicle travel location and generating an alarm signal when said abnormal travel detecting means detects said abnormal travel; and

(k) means coupled to said location storing and alarm generating means and said map data storing means for displaying a map stored in said map information data storing means, vehicle locations calculated by said calculating means and corrected by said location correcting means, the stored vehicle located at which the abnormal travel is detected and abnormal vehicle locations deviated from a map route.

4,882,690
INCREMENTAL LOGIC SYNTHESIS METHOD

Takao Shinsha, Yokohama; Masato Morita; Yoshinori Sakataya, both of Hadano; Yoji Tsuchiya, Hiratsuka; Mitsuhiro Hikosaka, Kawasaki; Junji Koshishita, Yokohama, all of Japan; Keiho Akiyama, Madison, Wis., and Takashige Kubo, Hachioji, Japan, assignors to Hitachi, Ltd.; Hitachi Microcomputer Engineering, Ltd. and Hitachi Software Engineering Co., Ltd., all of Tokyo, Japan

Filed Sep. 25, 1986, Ser. No. 911,461
Claims priority, application Japan, Sep. 26, 1985, 60-210920
Int. Cl.[4] G06F *15/60, 7/00*
U.S. Cl. 364—490 **55 Claims**



1. An incremental logic synthesis method executed by a computer, for synthesizing an up-dated gate-level logic circuit which performs up-dated functions of current functions which are performed by a current gate-level logic circuit so that part thereof is used in the up-dated circuit, wherein the current circuit may include a modification to an original gate-level logic circuit synthesized by a computer for performing the current functions, said method comprising the steps of:

(a) synthesizing an intermediate gate-level logic circuit which performs the up-dated functions, in response to input data describing the up-dated functions;

(b) synthesizing the up-dated circuit in response to data describing the synthesized intermediate circuit and to data describing the current circuit, wherein the synthesizing step includes the steps of

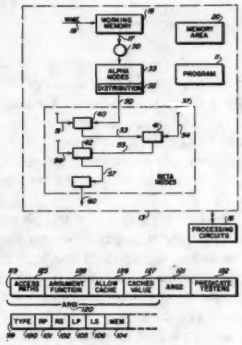
(b1) identifying a corresponding-portion pair which includes a first portion within the current circuit and a second portion within the intermediate circuit, wherein the first and second portions are mutually equivalent, and

(b2) combing the first portion within the current circuit with a portion other than the second portion, within the intermediate circuit, so as to obtain the up-dated circuit as a result of the combining.

4,882,691
CACHING ARGUMENT VALUES IN PATTERN-MATCHING NETWORKS

Marshall I. Schor, Katonah, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 7, 1988, Ser. No. 241,498
Int. Cl.[4] G06F *15/18*
U.S. Cl. 364—513 **15 Claims**



1. In a machine-effected method of updating a pattern-matching network having a plurality of pattern-matching nodes which are logically interconnected in logic paths so that argument inputs to the nodes come from diverse predecessor ones of the nodes; including the machine-executed steps of:

at a predetermined one of said nodes, passing a change token from a set of predecessor nodes to a first input of said one node for updating same;

at a predecessor node logically connected to a second input of said predetermined one of said nodes, storing a plurality of pattern match tokens;

for each test to be conducted, indicating whether or not the change token may result in changing values during test interation in a test to be conducted;

examining the node for tests to be conducted between the change token and partial match tokens available to said second input, if no tests are to be conducted, then proceeding to other machine operations, otherwise;

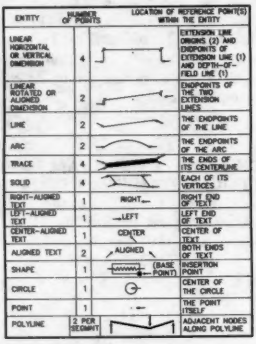
if the indication shows no changing values during said one test, computing the change token value for a first iteration of the test and caching the computed change token value for said one node and using the cached value for ensuing iterations of said one test, otherwise computing the

change token argument value at each iteration of said one test.

4,882,692
METHODS AND SYSTEMS FOR GENERATING PARAMETRIC DESIGNS

Jay R. Saxton; Andrew J. Sodt, and Dan J. Suslo, all of Bellingham, Wash., assignors to TransformerCAD, Inc., Bellingham, Wash.

Filed Oct. 30, 1986, Ser. No. 925,278
Int. Cl.[4] G06F *3/14*
U.S. Cl. 364—518 **75 Claims**



1. A method of employing a general purpose interactive system which includes a computer, a monitor coupled to and adapted to display data outputted from said computer, and a data entry device coupled to and adapted to input data to said computer to create an accomplished design by first engineering said design and then portraying said design in the form of electronically storable data, said method comprising the steps of:

employing said data entry device to establish a master drawing with text and dimensions represented by variables;

continuously displaying the updated master drawing on said monitor as said master drawing is established, whereby the user can visually monitor the appearance of said master drawing as it is established;

thereafter displaying on said monitor a design plan with an array of cells;

employing said data entry device to input to said design plan by inputting to, or modifying in, each of one or more of said cells a statement which defines a numerical or text value, at least one of said statements including a solicitation for information;

employing said data entry device to input to said computer an instruction which will:

(i) prevent further editing of said design plan, and

(ii) result in said monitor displaying those solicitations for information contained in statements in cells of the edited design plan; and thereafter:

employing said data entry device to input to said computer information solicited pursuant to statements in cells of the edited design plan;

displaying the information inputted by the user on said monitor so that the user can check the responses inputted to the computer; and

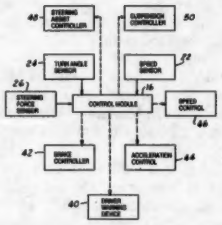
electronically storing in said computer data representing said accomplished design and generated by employing the computer to:

(i) resize elements of said master drawing represented by variables as necessary to conform to fixed dimensional values in cells of the edited design plan.

4,882,693
AUTOMOTIVE SYSTEM FOR DYNAMICALLY DETERMINING ROAD ADHESION

W. Trent Yopp, Canton, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 28, 1987, Ser. No. 137,908
Int. Cl.[4] G06F *15/00*
U.S. Cl. 364—424.01 **17 Claims**



1. A system for determining the road adhesion of a tire installed on a road wheel of an automotive vehicle operating on a roadway, comprising;

road wheel turn angle measuring means comprising means for producing a first signal representing the turn angle at which the steering system of said vehicle is being operated;

vehicle speed measuring means comprising means for producing a second signal representing the speed at which said vehicle is being operated;

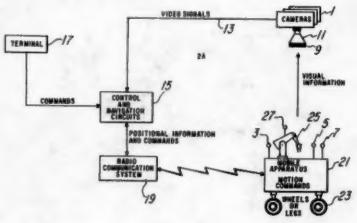
steering force measuring means comprising means for producing a third signal representing the steering force required to operate the steering system of said vehicle at said measured road wheel turn angle and said measured vehicle speed; and

processor means for determining the road adhesion of said tire, with said processor means comprising means for receiving said first, second, and third signals and means for deriving from said signals a fourth signal representing the magnitude of said road adhesion.

4,882,694
APPARATUS FOR VISUALLY LOCATING AND COMMUNICATING WITH MOBILE ROBOTS

William B. Brubaker, Dallas; John Slaughter; Donald J. Christian, both of Richardson, and Thomas J. Doty, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 771,322, Aug. 30, 1985, abandoned. This application May 12, 1988, Ser. No. 195,345
Int. Cl.[4] G06F *15/50*
U.S. Cl. 364—424.02 **14 Claims**



1. A combined communication and positioning system for a mobile apparatus, comprising:

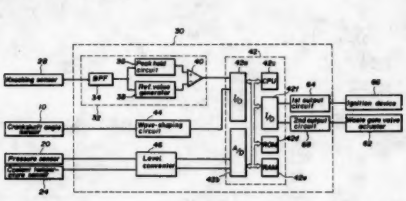
an apparatus light source mounted on the mobile apparatus;
a modulator electrically connected to the apparatus light source, wherein the modulator is for generating modulating data to be sent to the apparatus light source to modulate the light output of the apparatus light source;
a fixed light receiver off board the mobile apparatus for receiving data in the form of the modulated light from the mobile apparatus light source;
a fixed demodulator electrically connected to the fixed light receiver, for demodulating the light received from the apparatus light source;
a camera off board the mobile apparatus for forming an image of the apparatus light source to locate the position of the mobile apparatus; and
means for correlating said position of the mobile apparatus with the said data in the form of the modulated light received from the mobile apparatus light source, and for generating and transmitting navigation commands to said mobile apparatus, based upon said correlation.

4,882,695

CONTROL SYSTEM FOR IGNITION TIMING AND BOOST PRESSURE IN INTERNAL COMBUSTION ENGINE

Toshiyuki Mieno; Toyohei Nakajima, and Akira Nagao, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 19, 1987, Ser. No. 109,363
Claims priority, application Japan, Oct. 20, 1986, 61-248890
Int. Cl.[4] F02B *37/00*; F02P *5/15*
U.S. Cl. 364—431.08 **2 Claims**



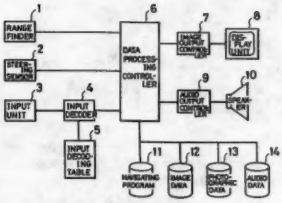
1. A system for controlling ignition timing and boost pressure in a multi-cylindered internal combustion engine equipped with a turbocharger for applying boost pressure into combustion chambers of the engine, said system comprising:
angular position detecting means for detecting an angular position of an engine crankshaft to generate an output signal indicative of an engine speed;
engine load state detecting means for detecting a state of engine load to generate an output signal in response thereto;
knock detecting means for detecting a knock condition of an engine for respective cylinders to generate an output signal in response thereto;
ignition control means for determining a basic ignition timing for each cylinder in response to signals output by the angular position detecting means and engine load state detecting means, and said ignition control means for determining an actual ignition timing for each cylinder by retarding the basic ignition timing by an amount when the knock condition, output by said knocking detecting means, is determined for each cylinder;
ignition means for igniting an air/fuel mixture in the combustion chamber of each cylinder in response to the actual ignition timing from the ignition control means;
pressure control means for determining a reduction timing of the boost pressure applied to the combustion chamber of the engine, said pressure control means receiving the actual ignition timing from the ignition control means and calculating a mean value of the actual ignition timing for all cylinders, said pressure control means comparing the mean value with a reference ignition timing, which is determined based upon the detected engine speed and engine load, and when the mean value is found to exceed the reference ignition timing in a retard direction, said pressure control means determining reduction of the boost pressure; and
actuator means for reducing the boost pressure in response to a signal from the pressure control means.

4,882,696

NAVIGATION APPARATUS

Mitsuhiro Nimura, and Shoji Yokoyama, both of Anjo, Japan, assignors to Aisin Aw Co., Ltd. and Kabushiki Kaisha Shinsangyokaihatsu, both of Aichi, Japan

Filed Jul. 11, 1988, Ser. No. 217,532
Claims priority, application Japan, Oct. 7, 1987, 53-173613
Int. Cl.[4] G06F *15/50*
U.S. Cl. 364—449 **5 Claims**



1. A navigation apparatus for navigating a vehicle in accordance with a preset course while measuring distance travelled and steering angle, comprising:
detecting means for detecting, immediately before a first intersection, whether distance from the first intersection to a second intersection at which the next turn is to be made is less than a predetermined value;
memory means for storing a voice track indication of lane information indicative of a lane into which the vehicle is to be steered after a turn is made at the first intersection; and
voice track indication output means for outputting the voice track indication of said lane information on the condition that said distance detected by said detecting means is less than said predetermined value.

4,882,697

STABILIZATION CONTROL CIRCUIT FOR VERTICAL POSITION IN AN INERTIAL NAVIGATOR

Hugh C. Ross, Clearwater, Fla., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Apr. 16, 1987, Ser. No. 39,497
Int. Cl.[4] G06F *15/50*
U.S. Cl. 364—454 **7 Claims**

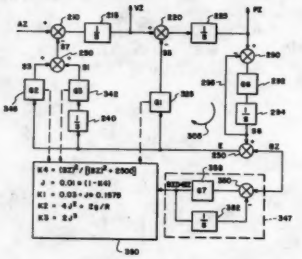
1. An apparatus for providing signals representative of vertical velocity and vertical position of an aircraft comprising:
first means for generating a first signal representative of vertical acceleration of said aircraft;
second means for generating a second signal representative of the altitude of said aircraft derived from a barometric altimeter;
third means for integrating the sum of said first signal and an acceleration correction signal to provide a vertical velocity output signal representative of the vertical velocity of said aircraft;
fourth means for integrating the sum of said vertical velocity output signal and a velocity correction signal to provide a vertical position output signal representative of the vertical position of said aircraft;
fifth means for time differentiating said second signal and

providing a third signal representative of said time differentiation of said second signal;

sixth means for generating an altitude error signal representative of the difference between said vertical position signal and said second signal;

seventh means for generating said velocity correction signal as a first function of said altitude error signal multiplied by a first variable gain value;

means for deriving said first variable gain value as a first selected function of said third signal, and in which said first variable gain value increases in value with increasing values of said third signal; and



eighth means for generating said acceleration correction signal as a second function of said altitude error signal, said second function including second and third variable gain values;

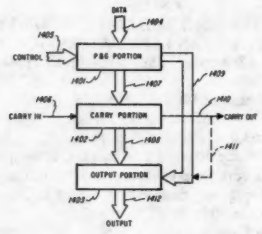
means for deriving said second and third variable gain values as second and third selected functions of said third signal, respectively, in which said second and third variable gain values decrease in value with increasing values of said third signal, such that said second function of said altitude error signal decreases in value for increasing values of said third signal.

4,882,698

CELL BASED ALU WITH TREE STRUCTURED CARRY, INVERTING LOGIC AND BALANCED LOADING

William R. Young, Palm Bay, Fla., assignor to Harris Corporation, Melbourne, Fla.

Filed Oct. 7, 1987, Ser. No. 106,071
Int. Cl.[4] G06F 7/50
U.S. Cl. 364—736 **31 Claims**



1. An arithmetic logic unit for executing a selected arithmetic operation on first and second digital code signals comprising:

a front end portion having a first plurality of input terminals to which respective bit signals of said first digital code signal are applied and a second plurality of input terminals to which respective bit signals of said second digital code signal are applied, said front end portion including arithmetic operation defining control lines and means for generating propagate and generate term signals for the respective bit positions of said digital code signals in accordance with logic signals applied to said arithmetic function defining control lines;

a carry propagation portion having a plurality of inputs coupled to receive from said front end portion the propagate and generate term signals for said respective bit positions, said carry propagation portion comprising carry propagation logic circuits and inverter circuits interconnected in a tree structure between said plurality of inputs and a plurality of outputs and providing at said plurality of outputs respective carry propagation signals associated with said respective bit positions; and

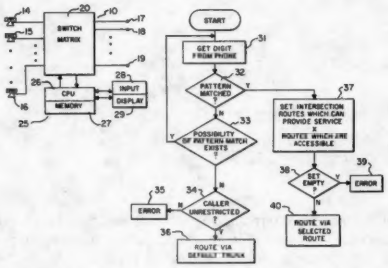
an output portion, coupled to said carry propagation portion and to said front end portion, and including means for logically combining propagate and generate signals with carry propagation signals to derive an arithmetic operation output code representative of an arithmetic operation executed on said first and second digital code signals.

4,882,699

COMMUNICATIONS NETWORK ROUTING AND MANAGEMENT SYSTEM

Mark C. Evensen, Colorado Springs, Colo., assignor to International Business Machines Corp., Armonk, N.Y.

Filed Sep. 19, 1988, Ser. No. 246,477
Int. Cl.[4] H04Q 3/42
U.S. Cl. 379—284 **16 Claims**



12. In a telephone switching system having a plurality of input/output connections including communication lines and trunks and with a central processing unit coupled for sensing signals present on the lines or trunks and with a switching means connected for responding to the central processing unit by establishing appropriate interconnections between the connected lines and trunks, a process for configuring the system to provide predetermined responses to alphanumeric input signals comprising the steps of

composing a list of acceptable regular expressions of alphanumeric data which may appear in sequence on any given input connection,

ordering said list in a predetermined alphanumeric sequence,

inspecting each regular expression of said sequenced list for sequential states for constructing a transition graph with each transition graph trail ending in an action indicator,

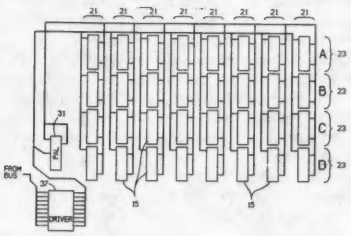
forming a table of system actions with each said action specifically addressable by at least one said action indicator, and

responding to concurrence of a received regular expression and a selected system action from said table for selecting between completion of an input/output interconnection and provision of a signal that the received regular expression will not cause the system to complete an interconnection.

4,882,700
SWITCHED MEMORY MODULE

Karl H. Mauritz, Eagle; Geary L. Leger, Boise, both of Id.; Joseph B. Wicklund, Bothell, Wash.; James E. Herrud, and Steven H. Laney, both of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.

Filed Jun. 8, 1988, Ser. No. 204,078
Int. Cl.[4] G11C *13/00*
U.S. Cl. 365—51 22 Claims



1. Method of operating a memory array in which a plurality of memory circuit devices are arranged in a manner such that memory information is obtained by addressing bits of information from a selected number of the memory devices in the array in a format, the devices being addressed by using address enable signals to address each device, and the format of bits form a byte of memory data such that each byte includes bits from each memory device in the selected number of the circuit devices, and wherein the bits are addressed as rows and columns of information in a matrix on each memory device, characterized by:

(a) arranging the memory devices into a plurality of columns of memory devices, and a plurality of rows of memory devices;

(b) selectively enabling the addressing of the different rows of the memory devices by selectively providing said address enable signals to the respective rows of the devices, wherein each of a selected number of the memory devices in one row are addressed simultaneously as an address command response and a like number of memory devices in other rows are addressed at different times, the addressing of the different rows of the memory devices being accomplished in like sequences of rows and columns on a plurality of the devices;

(c) addressing each row of the memory devices while not enabling the memory devices in the other rows to be addressed.

4,882,701
LOOKAHEAD PROGRAM LOOP CONTROLLER WITH REGISTER AND MEMORY FOR STORING NUMBER OF LOOP TIMES FOR BRANCH ON COUNT INSTRUCTIONS

Hideshi Ishii, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 898,201, Aug. 20, 1986, abandoned.
This application Sep. 23, 1988, Ser. No. 249,254
Claims priority, application Japan, Aug. 22, 1985, 60-185328
Int. Cl.[4] G06F *9/00, 9/06, 9/38, 9/42*
U.S. Cl. 364—900 4 Claims

1. A branch instruction processing unit which executes branch-on-count instructions for loop control of a program by means of pipeline control, comprising:

memory means for storing a number of loop times designated by each of said branch-on-count instructions;

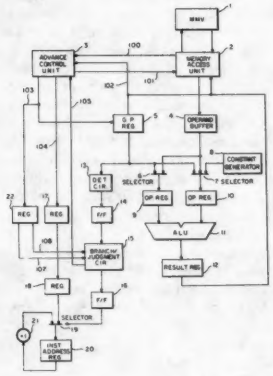
first control means for loading the number of loop times into said memory means from a loop times holding register;

first storing means for storing an output of said memory means;

detection means for detecting whether or not the output of said memory means is equivalent to a predetermined value while the output is being stored in said first storing means;

decrementing means for decrementing a count of said first storing means by a preselected value following said detecting by the detection means that said output of said memory means is equivalent to said predetermined value;

second storing means for storing an output of said decrementing means;



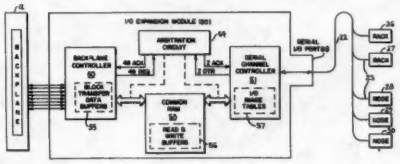
second control means for writing the output of said second storing means into said memory means; and

branch execution means responsive to an output of said detection means for transferring control to branch address when said detection means detects that an output of said memory means is equal to said predetermined value upon execution of said branch-on-count instruction and not branching to said branch address when said detection means detects that an output of said memory means is not equal to said predetermined value.

4,882,702
PROGRAMMABLE CONTROLLER WITH I/O EXPANSION MODULE LOCATED IN ONE OF I/O MODULE POSITIONS FOR COMMUNICATION WITH OUTSIDE I/O MODULES

Odo J. Struger, Chagrin Falls; Mark Luboski, Euclid, and Timothy J. Murphy, Hudson, all of Ohio, assignors to Allen-Bradley Company, Inc., Milwaukee, Wis.

Continuation of Ser. No. 845,965, Mar. 31, 1986, abandoned.
This application May 16, 1988, Ser. No. 195,407
Int. Cl.[4] G06F *13/38, 13/28, 13/10*
U.S. Cl. 364—900 10 Claims
MICROFICHE APPENDIX INCLUDED
(2 Microfiche, 2 Pages)



4. An I/O expansion module for connection to a backplane in a primary equipment rack that is adapted to hold an in-rack

processor and a plurality of first tier I/O modules and for communication with one or more second tier I/O modules residing outside the primary equipment rack, the I/O expansion module comprising:

backplane controller means for electronic communication with the in-rack processor through the backplane when the I/O expansion module is located in any one of a plurality of individually addressable I/O module positions corresponding to image table memory addresses existing within the in-rack processor prior to I/O expansion, the backplane controller means communicating during operation with the in-rack processor for transfer of bytes of parallel I/O status data through the rack backplane to the I/O expansion module residing at a single open of the addressable I/O module positions existing prior to I/O expansion as part of a routine in which modules in respective I/O module positions in the equipment rack are enabled for communication with the in-rack processor;

a serial I/O port for communication with one or more second tier I/O modules located outside the equipment rack;

serial channel controller means coupled to the serial I/O port, wherein the serial channel controller means includes a second image table for storing the bytes of I/O status data in locations associated with the one or more second tier I/O modules;

means for transferring I/O status data between the backplane controller means and the second image table in the serial channel controller means; and

wherein the serial channel controller means also includes means for controlling the serial communication of I/O status data between the second image table and the one or more second tier I/O modules.

4,882,703

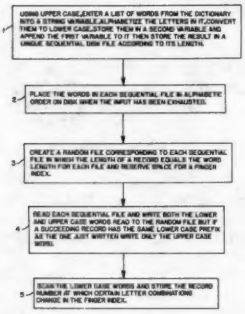
PROCEDURE FOR FINING ALL WORDS CONTAINED WITHIN ANY GIVEN WORD INCLUDING CREATION OF A DICTIONARY

Robert L. Nicolai, 4038 N. 9th St., St. Louis, Mo. 63147

Continuation-in-part of Ser. No. 651,583, Sep. 17, 1984, abandoned. This application Dec. 15, 1986, Ser. No. 941,773

Int. Cl.[4] G06F *7/24*

U.S. Cl. 364—900 **3 Claims**


1
USING UPPER CASE,ENTER A LIST OF WORDS FROM THE DICTIONARY INTO A STRING VARIABLE,ALPHABETIZE THE LETTERS IN IT,CONVERT THEM TO LOWER CASE,STORE THEM IN A SECOND VARIABLE AND APPEND THE FIRST VARIABLE TO IT THEN STORE THE RESULT IN A UNIQUE SEQUENTIAL DISK FILE ACCORDING TO ITS LENGTH.
2
PLACE THE WORDS IN EACH SEQUENTIAL FILE IN ALPHABETIC ORDER ON DISK WHEN THE INPUT HAS BEEN EXHAUSTED.
3
CREATE A RANDOM FILE CORRESPONDING TO EACH SEQUENTIAL FILE IN WHICH THE LENGTH OF A RECORD EQUALS THE WORD LENGTH FOR EACH FILE AND RESERVE SPACE FOR A FINGER INDEX.
4
READ EACH SEQUENTIAL FILE AND WRITE BOTH THE LOWER AND UPPER CASE WORDS READ TO THE RANDOM FILE BUT IF A SUCCEEDING RECORD HAS THE SAME LOWER CASE PREFIX AS THE ONE JUST WRITTEN WRITE ONLY THE UPPER CASE WORD.
5
SCAN THE LOWER CASE WORDS AND STORE THE RECORD NUMBER AT WHICH CERTAIN LETTER COMBINATIONS CHANGE IN THE FINGER INDEX.

1. A computer implemented method for processing words from a standard dictionary into a special dictionary by using a programmable digital computer system comprising the following steps:

(a) inputting a word in upper case letters from the standard dictionary as a first of two string variables for use by the computer, creating a second such string variable from the first string variable by alphabetizing the letters in the first string variable and converting said letters to lower case, then appending the first string variable to the second string variable to provide a concatenated record and storing the result as one record in a different sequential disk file respectively created for each different length record,

(b) repeating step a) for each different word of said standard dictionary.

(c) placing the concatenated records in each sequential file in alphabetic order on disk media of the computer after input of such dictionary words is complete,

(d) creating a corresponding random file for each sequential file in which the length of a record is equal to the length of the word so input from the standard dictionary in the sequential file, then reserving the first two words in each such random file for a finger index,

(e) reading each sequential file, then writing both the lower and upper case words read to the corresponding random file, but if a succeeding record has the same lower case prefix as the one just written, then writing only the upper case word following the record just written, and

(f) scanning the lower case words in each random file and storing the record number at which certain preselected letter prefixes change in a predetermined location of said first two words of the random file as a pointer or finger index.

4,882,704

HAND-SHAKE TYPE DATA TRANSFER CONTROL CIRCUIT

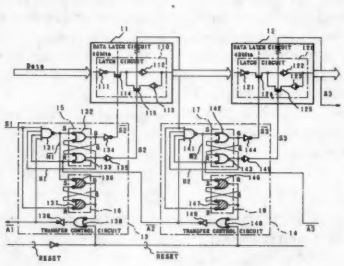
Shinji Komori; Hidehiro Takata; Toshiyuki Tamura, and Fumiyasu Asai, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Feb. 17, 1988, Ser. No. 157,194

Claims priority, application Japan, Feb. 18, 1987, 62-36551

Int. Cl.[4] G06F *1/00*

U.S. Cl. 364—900 **25 Claims**



1. A handshake type control circuit for controlling data transfer at a given stage in response to a send signal, said control circuit comprising:

a circuit, responsive to said send signal and an acknowledge signal fed back from a succeeding stage, for activating a transfer control signal a first time to activate data transfer at said given stage when said send signal is activated and for inactivating said transfer control signal to inactivate data transfer at said given stage when said acknowledge signal is activated, said circuit prevented from activating said transfer control signal a second time to prevent recurring data transfer at said given stage until said send signal has been reset, whereby parasitic oscillation is prevented.

4,882,705

DATA TRANSMISSION SYSTEM INCLUDING THE DOWNLOADING OF A FIRST PROGRAM FOR THE INTERRUPTION OF A SECOND PROGRAM

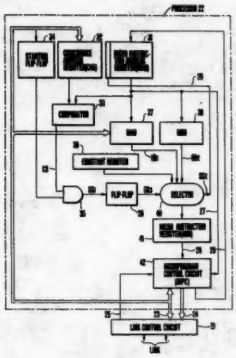
Kazuo Yasue, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 804,432, Dec. 4, 1985, abandoned. This application Aug. 2, 1988, Ser. No. 227,461

Claims priority, application Japan, Dec. 7, 1984, 59-257365

Int. Cl.[4] G06F *9/00*

U.S. Cl. 364—900 1 Claim



1. A data transmission system comprising:

a transmission link;

at least one first station connected to said transmission link; and

a plurality of second stations connected to said transmission link;

said first station including means for transferring to a selected one or more of said second stations a first program and a first address representing a condition to start execution of the first program in said second station;

each of said second stations including first storage means for storing a second program prior to the transferring of the first program and first address,

second storage means for storing the first address transmitted from said first station,

third storage means for storing the first program transferred from said first station in a storage area starting from a third address,

address register means for sequentially storing second addresses for addressing said first storage means and said third storage means,

means for executing the programs stored in said first storage means and said third storage means in accordance with the second addresses sequentially stored in said address register means,

coincidence detecting means for detecting a coincidence between the first address stored in said second storage means and the second address stored in said address register means during execution of said second program, and

means for interrupting, after the first program and the first address are transferred from said first station to said second station, the execution of the second program to start execution of the first program stored in said third storage means by storing the third address into said address register means when said detecting means detects the coincidence during execution of said second program, the second program continuing to be executed if the coincidence is not detected during the execution thereof.

4,882,706

DATA STORAGE ELEMENT AND MEMORY STRUCTURES EMPLOYING SAME

Alan W. Sinclair, Cambridge, England, assignor to Anamartic Limited, London, England

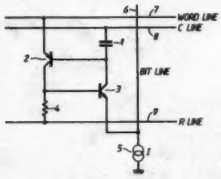
PCT No. PCT/GB86/00328, § 371 Date Feb. 5, 1987, § 102(e) Date Feb. 5, 1987, PCT Pub. No. WO86/07487, PCT Pub. Date Dec. 18, 1986

PCT Filed Jun. 9, 1986, Ser. No. 6,720

Claims priority, application United Kingdom, Jun. 7, 1985, 8514452

Int. Cl.[4] G11C *11/34, 7/00, 8/00*

U.S. Cl. 365—180 29 Claims



1. A dynamic electrical data storage element which provides for alteration of its stored data, including:

switch means having first and second regions and first and second control ports, through which control ports the switch means is controllable to be set to a first or a second state corresponding to the regions being connected to each other or disconnected from each other,

electrical charge storage means connected to so control said switch means, by way of one of its control ports, that the switch means assumes one of its two possible states when the charge on the charge storage means lies within a first range and the switch means assumes a the other of its two states when the charge on the charge storage means lies within a second range which excludes the first range,

a first address line connected to the first region of the switch means,

a second address line connected to the charge storage means, and

a data line connected to the second region of the switch means,

so that, in operation, data is written into the data storage element as a charge set on the charge storage means by signals applied to the data storage element by way of the address lines and data line, and data held by the data storage element is read by sensing the state of the switch means by way of the first address line and the data line.

4,882,707

NON-VOLATILE SEMI-CONDUCTOR MEMORY DEVICE WITH DOUBLE GATE STRUCTURE

Yoshihisa Mizutani, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 111,717, Oct. 23, 1987, abandoned. This application Feb. 27, 1989, Ser. No. 316,534

Claims priority, application Japan, Oct. 27, 1986, 61-255149; Oct. 27, 1986, 61-255150; May 21, 1987, 62-122401

Int. Cl.[4] G11C *11/34;* H01L *29/78, 27/02, 27/10*

U.S. Cl. 365—185 14 Claims

1. A non-volatile semiconductor memory device comprising:

(a) a semiconductive substrate of a first conductivity type;

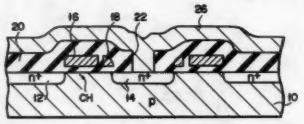
(b) parallel bit lines provided above said substrate;

(c) parallel work lines provided above said substrate so as to insulatively cross said bit lines;

(d) a first semiconductive diffusion layer of a second conductivity type, provided in said substrate, for serving as a common wiring line;

(e) memory cells formed on said substrate in such a manner

as to be connected to cross points between said bit lines and said word lines, each of said memory cells comprising, second and third semiconductive diffusion layers of the second conductivity type, formed in said substrate spaced apart from each other, said second diffusion layer being connected to said common wiring line, said third diffusion layer being connected to one of said bit lines, said second and third diffusion layers respectively functioning as source and drain in a data write mode and respectively functioning as drain and source in a data read mode of said memory device,



a floating gate layer, insulatively provided above said substrate, for storing carriers representing information, and

a control gate layer insulatively provided above said substrate and connected to one of said word lines; and

(f) voltage applications means, connected to said memory cells, for initially applying a bias voltage to said bit lines and said common wiring line while said word lines are grounded in one of the data write mode and the data read mode of said memory device, and for selecting a desired memory cell by dropping the applied voltage to that bit line which is connected to the desired memory cell.

4,882,708

SEMICONDUCTOR MEMORY DEVICE

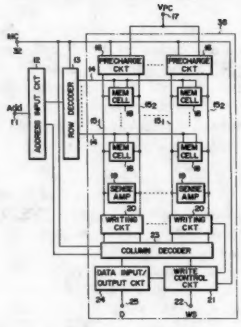
Shigeyuki Hayakawa; Mitsuo Isobe, both of Yokohama, and Takayuki Ohtani, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 19, 1988, Ser. No. 145,411

Claims priority, application Japan, Jan. 19, 1987, 62-9281

Int. Cl.[4] G11C 7/00

U.S. Cl. 365—189.04 **6 Claims**



1. A semiconductor memory device for simultaneously writing same data into all memory cells by a writing circuit in a clear mode, said device comprising:

a plurality of memory cells for storing data;

bit lines for performing data transfer to and from the memory cells;

a sense amplifier for amplifying the data read out from the memory cells onto the bit lines;

a writing circuit for writing data into said memory cells via said bit lines;

word lines for selecting said memory cells;

a row decoder for selecting said word lines;

a column decoder for selecting said bit lines;

an address input circuit for supplying an address signal to the column decoder;

load means provided between said bit lines and a potential source, said load means being set in an off-state by the supply of a memory clear signal; and

control means for controlling said decoders when said memory clear signal is supplied so as to set all the word lines in a selective state.

4,882,709

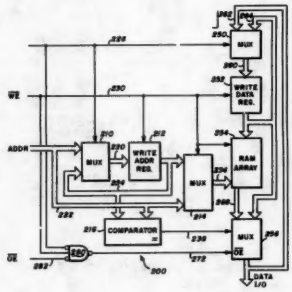
CONDITIONAL WRITE RAM

David C. Wyland, San Jose, Calif., assignor to Integrated Device Technology, Inc., Santa Clara, Calif.

Filed Aug. 25, 1988, Ser. No. 236,552

Int. Cl.[4] G11C 7/00

U.S. Cl. 365—189.02 **8 Claims**



1. A conditional write means random access memory circuit comprising in combination:

an external address bus for connection to receive a plurality of externally-generated signals representing an address;

an internal address bus;

a write address register including a plurality of data inputs, a clock input for connection to receive a predetermined one of at least two externally-generated control signals, and a plurality of data outputs connected to said internal address bus, said write address register for storing the state of each of said externally-generated address signals at each of a series of times marked by said write address register one of said externally-generated control signals and for developing on said internal address bus a plurality of signals each having a corresponding one of said stored externally-generated address signal states;

an address multiplexer including a plurality of A-inputs connected to said internal address bus, a plurality of B-inputs, a select input for connection to receive a predetermined one of said externally-generated control signals, and a plurality of outputs, said address multiplexer for developing at said address multiplexer outputs a plurality of signals each having the same state as a corresponding one of said internal address bus signals when said address multiplexer one of said externally-generated control signals has a predetermined state and having the same state as a corresponding one of said externally-generated address signals when said address multiplexer one of said externally-generated control signals has another predetermined state;

a comparator including a plurality of P-inputs connected to said internal address bus, a plurality of Q-inputs, and an output, said comparator for developing at said comparator output a signal having a predetermined state when the states of said internal address bus signals match those of

said externally-generated address signals and having another predetermined state otherwise;

address coupling means connected to said external address bus, to said write address register data inputs, to said address multiplexer B-inputs, and to said comparator Q-inputs, said address coupling means for coupling each of said externally-generated address signals to said write address register data inputs, to said address multiplexer B-inputs, and to said comparator Q-inputs;

at least one external data line for connection to receive at least one externally-generated signal representing at least one bit of data;

at least one internal data line;

a write data register including at least one data input, a clock input for connection to receive a predetermined one of said externally-generated control signals, and at least one data output connected to said internal data line, said write data register for storing the state of said externally-generated data signal at each of a series of times marked by said write data register one of said externally-generated control signals and for developing on said internal data line at least one signal having said stored externally-generated data signal state;

data coupling means connected to said external data line and to said write data register data input, said data coupling means for coupling said externally-generated data signal to said write data register data input;

a random access memory array including a plurality of address inputs each connected to said address multiplexer outputs, at least one data input connected to said internal data line, a write-enable input for connection to receive a predetermined one of said externally-generated control signals, and at least one data output; and

a data multiplexer including at least one A-input connected to said internal data line, at least one B-input connected to said random access memory array data output, a select input connected to said comparator output, and at least one output, said data multiplexer for developing at said data multiplexer output at least one signal having the same state as said internal data line signal when said comparator output signal has a predetermined state and having the same state as a signal developed at said random access memory array data output when said comparator output signal has another predetermined state.

4,882,710

FIFO MEMORY INCLUDING DYNAMIC MEMORY ELEMENTS

Masashi Hashimoto, Ami; Sasaki Kenji, Kukizaki, and Masayoshi Nomura, Tsuchiura, all of Japan, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Sep. 9, 1987, Ser. No. 94,943

Claims priority, application Japan, Sep. 18, 1986, 61-220270

Int. Cl.[4] G11C *7/00*; G09G *1/02*

U.S. Cl. 365—189.05 **9 Claims**

1. A memory device capable of FIFO data operation, said memory device comprising:

dynamic memory array means having a plurality of dynamic memory cells arranged in rows and columns;

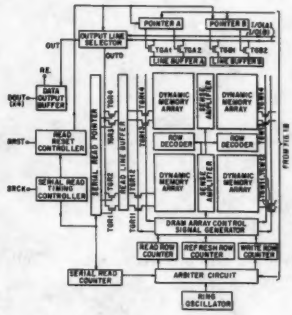
a write line buffer memory disposed on the input side and a read line buffer memory disposed on the output side of said dynamic memory array means for data transfer to and from said dynamic memory array means in a serial-parallel-serial arrangement to provide serial-parallel conversion of write data and parallel-serial conversion of read data;

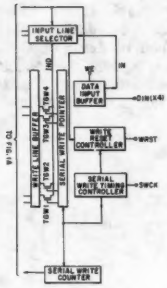
line buffer memory means;

data input means connected to said line buffer memory means and to said write line buffer memory for selectively providing input data as write data to either said line buffer memory means or said write line buffer memory;

data output means connected to said line buffer memory means and to said read line buffer memory for selectively receiving output data as readout data from either said line buffer memory means or said read line buffer memory; and

control circuit means operably connected to said dynamic memory array means, said write line buffer memory, said read line buffer memory, said line buffer memory means,





said data input means, and said data output means for regulating data transfer by connecting said line buffer memory means to said data input means and said data output means in tandem with connecting said write line buffer memory to said data input means and said read line buffer memory to said data output means.

4,882,711

NON-VOLATILE MEMORY SYSTEM

Pierre Guillot, Geneva, Switzerland, assignor to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 3, 1988, Ser. No. 151,864

Claims priority, application United Kingdom, Feb. 7, 1987, 8702784

Int. Cl.[4] G11C *13/00*

U.S. Cl. 365—229 **3 Claims**

1. A memory system comprising:

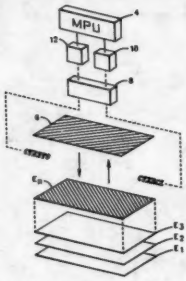
a first volatile memory having a plurality of memory cells;

a plurality of second, non-volatile memories each having a plurality of memory cells;

a register for holding an indication of a predetermined one of the plurality of second memories;

power-down means fro sensing when power is withdrawn from the first memory and for transferring in response thereto contents of the cells of the first memory to the cells of the predetermined one of the plurality of second memories whose indication is held in the register; and

power-up means for sensing when power is applied to the first memory and for transferring in response thereto



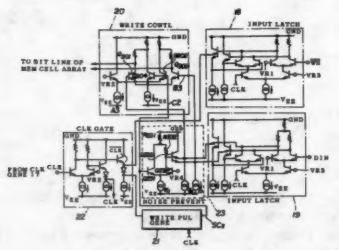
contents of the cells of a second memory to the cells of a first memory.

4,882,712

SYNCHRONOUS SEMICONDUCTOR MEMORY DEVICE

Chikai Ohno, and Michiyuki Hirata, both of Kasugai, Japan, assignors to Fujitsu Limited, Kawasaki and Fujitsu VLSI Limited, Kasugai, both of, Japan

Filed Sep. 26, 1988, Ser. No. 249,058
Claims priority, application Japan, Sep. 29, 1987, 62-244695
Int. Cl.[4] G11C *11/40*
U.S. Cl. 365—206 **9 Claims**



1. A synchronous semiconductor memory device comprising:

first latch means for latching a write command in synchronism with a clock signal;

second latch means for latching a write data in synchronism with the clock signal and for outputting two write process signals based on the write data latched thereby;

pulse generating means for generating an internal write pulse signal based on the write command latched by said first latch means, said internal write pulse signal having a first logic level only in a write mode of the synchronous semiconductor memory device;

write control means supplied with said internal write pulse signal and said write process signals for controlling write and read operations of the synchronous semiconductor memory device;

memory means for storing the write data latched by said second latch means; and

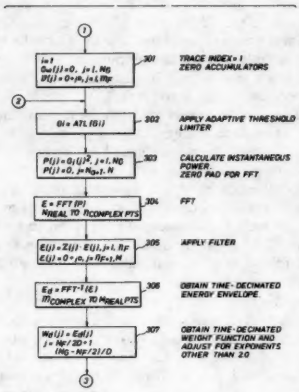
noise preventing means coupled to said second latch means and said write control means for supplying said write process signals to said write control means only in the write mode responsive to said internal write pulse signal and for setting said write process signals to fixed potentials during a time other than the write mode.

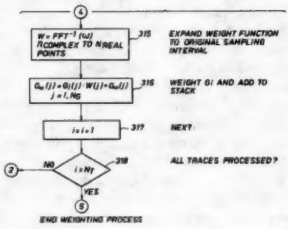
4,882,713

METHOD FOR NOISE SUPPRESSION IN THE STACKING OF SEISMIC TRACES

Philip A. Hughes, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed Sep. 6, 1988, Ser. No. 240,956
Int. Cl.[4] G01V *1/36*
U.S. Cl. 367—47 **6 Claims**





1. The method of optimizing signal-to-sporadic noise in a stack of related seismic traces where the individual seismic traces are acquired in an environment where noises of a time-

variant and of a time-invariant nature are present, which comprises

removing gross amplitude anomalies from each of said seismic traces to produce anomalies-reduced seismic traces,

establishing a plurality of weight functions, each one of said weight functions being in a one-to-one correspondence with one of a plurality of said anomalies-reduced seismic traces,

summing all of said weight functions to produce a weight stack,

applying each one of said weight functions to each corresponding one of said anomalies-reduced seismic traces to obtain a weighted seismic trace,

summing all of said weighted seismic traces to form a weighted trace stack, and

dividing said weighted trace stack by said weight stack to produce an optimized stack trace, to optimize the signal component and to reduce the noise component.

4,882,714

OBJECT DETECTING SYSTEM USING ULTRASONIC WAVES

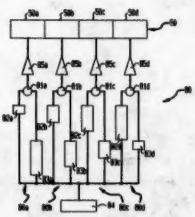
Hiroshi Tanigawa, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 15,523, Feb. 13, 1987, abandoned, which is a continuation of Ser. No. 699,200, Feb. 7, 1985, abandoned. This application Jan. 7, 1988, Ser. No. 143,289

Claims priority, application Japan, Feb. 7, 1984, 59-20290; Feb. 7, 1984, 59-20291; Feb. 7, 1984, 59-20292; Feb. 7, 1984, 59-20295; Feb. 7, 1984, 59-20296; Feb. 7, 1984, 59-20297

Int. Cl.[4] G01S *15/06*

U.S. Cl. 367—103 **1 Claim**



1. An object detecting system comprising:

an ultrasonic element array comprising a plurality of ultrasonic transducer elements;

means for intermittently supplying burst driving pulses to said ultrasonic transducder elements at different times in each of successive intermittent periods, said means for intermittently supplying burst driving pulses comprising:

driving pulsers for said ultrasonic transducer elements, respectively, each driving pulser comprising first and second delay circuits in parallel, said first and second delay circuits having controllable delays;

means for supplying a sequence of pulse bursts to the first and the second delay circuits of said driving pulsers to make the first and the second delay circuits of said driving pulsers produce said burst driving pulses with said different times determined by the controllable delays of the first and the second delay circuits of said driving pulsers in each of said successive intermittent periods; and

means for delivering said burst driving pulses from the first and the second delay circuits of said driving pulsers to said ultrasonic transducer elements, said means for delivering said burst driving pulses comprising:

adding means for adding the burst driving pulses of the first and the second delay circuits of said driving pulsers with the burst driving pulses of the first and the second delay circuits of each driving pulser arranged as a driving burst succession of two driving bursts in response to each of said pulse bursts at a time interval dependent on said different times in each of said successive intermittent periods; and

means for supplying said ultrasonic transducer elements with the driving burst successions into which the burst driving pulses of the first and the second delay circuits of said driving pulsers are added in response to each of said pulse bursts in each of said successive intermittent periods; and

means for controlling time relationships between said different times in said successive intermittent periods,

said means for controlling time relationships controlling the controllable delays of the first and the second delay circuits of said driving pulsers in said successive intermittent periods.

4,882,715

SURFACE ACOUSTIC WAVE CONVOLVER WITH DIELECTRIC FILM OF HIGH NON-LINEAR EFFECT

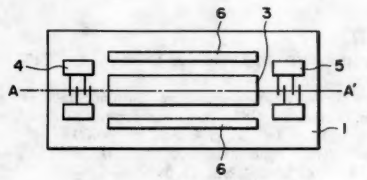
Koichi Egara, Tokyo; Norihiro Mochizuki, Yokohama; Kenji Nakamura, Hadano, and Kazuo Yoshinaga, Machida, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 11, 1988, Ser. No. 167,254

Claims priority, application Japan, Mar. 16, 1987, 62-60466; Sep. 4, 1987, 62-220489

Int. Cl.[4] H04R *23/00*; H01L *41/08*

U.S. Cl. 367—140 **8 Claims**



1. A surface acoustic wave elastic convolver comprising:

a piezoelectric substrate;

plural input transducers formed on said substrate, for respectively generating surface acoustic waves corresponding to input signals;

an output transducer for obtaining a convolution signal of said input signals, from a surface acoustic wave generated by non-linear interaction, of the surface acoustic waves thus generated by said input transducers; and

a dielectric film of a non-linear effect larger than that of said substrate, formed on said substrate in at least the area wherein said output transducer is formed.

4,882,716

OPTIC FIBER HYDROPHONE AND ANTENNA ASSOCIATING A SERIES OF HYDROPHONES

Herve Lefevre, Paris; Dominique Rojas, Arcueil, and Marc Turpin, Bure sur Yvette, all of France, assignors to Thomson-CSF, Paris, France

Filed Jan. 24, 1989, Ser. No. 300,933

Claims priority, application France, Jan. 25, 1988, 88 00781

Int. Cl.[4] H04R *1/02*

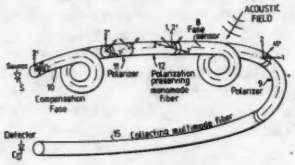
U.S. Cl. 367—149 **5 Claims**

1. An optic fiber hydrophone comprising:

a wide spectrum source of a linearly polarized, superluminescent diode type;

a first side-hole optic fiber, called a compensation fiber, not subjected to the field of pressure to be detected, followed by a first polarizer with an axis at 45° to the neutral axes of the fiber which are themselves at 45° to the polarization of the source, forming an interferometer;

a passive sensor, subjected to the field of pressure, comprising a second side-hole optic fiber, having neutral axes reversed with respect to those of the compensation fiber, coupled to the first polarizer and followed by a second polarizer at 45° to the neutral axes of the fiber, forming a



second interferometer at the output of which the working differences between the two polarizations, which are not due to the field of pressure, are compensated for;

a detector;

and a circuit for processing radiation detected by the detector.

4,882,717

CHARGING CIRCUIT FOR AN ANALOG ELECTRONIC TIMEPIECE

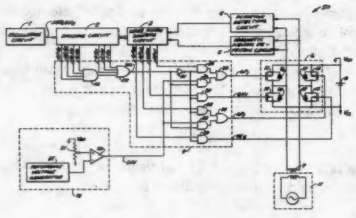
Motomu Hayakawa, and Masahito Yoshino, both of Suwa, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan

Filed Sep. 20, 1988, Ser. No. 246,718

Claims priority, application Japan, Sep. 21, 1987, 62-236463; Sep. 21, 1987, 62-236464; Sep. 21, 1987, 62-236465

Int. Cl.[4] G04B *1/00*; H01M *10/46*

U.S. Cl. 368—64 **13 Claims**



1. A chargeable analog electronic timepiece chargeable by an external A.C. voltage source comprising:

a step motor having a driving coil, the coil having a first terminal and a second terminal;

a chargeable battery;

motor driving means coupled to the first terminal of the coil and the second terminal of th coil for receiving A.C. voltage and selectively applying a charge to the coil for driving the motor and for selectively applying a charge to the coil for charging the chargeable battery;

charge control means for controlling the period in which the motor driving means charges the chargeable battery and drives the motor; and

rectifying means for rectifying the A.C. voltage prior to charging of the secondary battery, the rectifying means including at least one PN junction placed in parallel to the motor driving means.

4,882,718

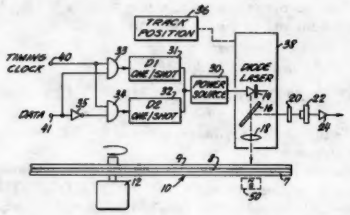
SINGLE-HEAD, DIRECT OVERWRITE MAGNETO-OPTIC SYSTEM AND METHOD

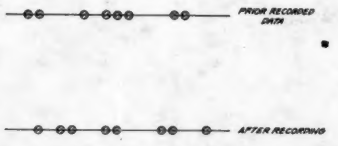
Mark H. Kryder, and Han-Ping D. Shieh, both of Pittsburgh, Pa., assignors to Movid Information Technology, Inc., Schenectady, N.Y.

Continuation-in-part of Ser. No. 33,931, Apr. 3, 1987, abandoned, which is a continuation of Ser. No. 837,130, Mar. 7, 1986, Pat. No. 4,679,180. This application Feb. 10, 1988, Ser. No. 154,240

Int. Cl.[4] G11B *11/12, 13/04*

U.S. Cl. 369—13 **22 Claims**





1. A magneto-optic information storage system comprising:

a thin-film magneto-optic recording medium having its net magnetization perpendicular to a plane containing said thin film medium, said medium being formulated to exhibit self-inversion of the direction of net magnetization in at least a portion of a magnetic domain wall bounded region thereof at an elevated temperature above a compensation temperature of the medium and below the Curie temperature of the medium in the absence of an externally applied bias magnetic field;

irradiating means for temporarily irradiating at least portions of selected regions of the medium with electromagnetic radiation imparting sufficient energy to heat at least said portions from ambient temperature to said elevated temperature whereat the net magnetization of at least said portions is reversed without an externally applied bias magnetic field and whereby, following cooldown to ambient temperature, the net magnetization of at least said portions at ambient temperature is also reversed;

write means connected to control said irradiating means for temporarily impinging a first pulse of light having a first duration and a first power level upon selected areas of the medium to create magnetic domain wall bounded regions therein and to orient the net magnetization of said regions in a first direction; and

erase means connected to control said irradiating means for impinging a second pulse of light upon at least portions of selected ones of said regions to re-orient the net magnetization of at least said portions in a second direction opposite to said first direction, said second pulse of light energy having a second duration and second power level, and

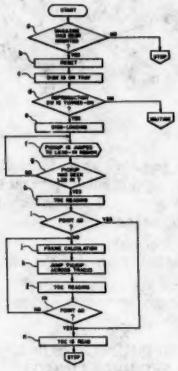
wherein the energy imparted by said second pulse is less than the energy imparted by said first pulse.

4,882,719

DISK PLAYING METHOD FOR DISK PLAYER

Toshiyuki Kimura; Yoshio Aoyagi, and Fumio Endo, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Division of Ser. No. 164,353, Mar. 4, 1988, Pat. No. 4,855,979.
This application Oct. 5, 1988, Ser. No. 253,472
Int. Cl.[4] G11B *7/00, 27/10*
U.S. Cl. 369—32 **2 Claims**



1. A disk playing method for a disk player, comprising the steps of: reading an accumulated total time code in a lead-in area of a disk; detecting a predetermined code during said reading step; if said predetermined code is not detected in reading said accumulated total time code in said lead-in region of said disk carrying out frame calculation to jump a pickup of said disk player across tracks to read another accumulated total time code; and after said predetermined code has been read, reading necessary data from said lead-in region.

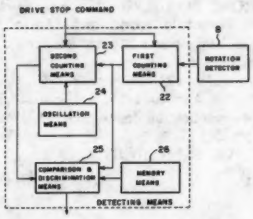
4,882,720

MEMORY DEVICE INCLUDING A ROTATING DISK AND MEANS FOR DETECTING CHANGE IN FRICTIONAL RESISTANCE BETWEEN THE DISK AND A READ/RECORD HEAD

Masaharu Sengoku, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 7,466, Jan. 28, 1987, Pat. No. 4,809,248.
This application Aug. 26, 1988, Ser. No. 236,923
Claims priority, application Japan, Mar. 5, 1986, 61-47732; Mar. 5, 1986, 61-47733
The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.
Int. Cl.[4] G11B *15/52*
U.S. Cl. 369—47 **4 Claims**

1. A memory apparatus comprising:
a disk having an information recording surface,
a rotary apparatus which rotates the disk,
a rotation detector which detects a rotating position of the disk to produce a rotary pulse signal,
a rotation control apparatus which produces a start rotation command and which controls rotation of the rotary apparatus based upon the detection result of the rotation detector,
a head which is arranged opposite to the information recording surface of the disk and which records information to be stored on the disk,
means which is responsive to the start rotation command from the rotation control apparatus for counting the number of rotary pulse signals during a predetermined period within a period from initiation of such start rotation com-



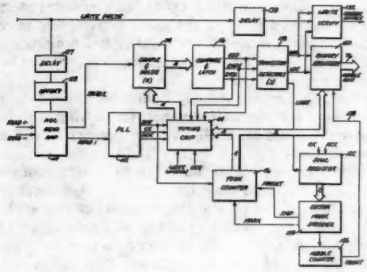
mand to normal completion of starting by the rotary apparatus, and
means for determined a defect in operation of the memory based upon the count of the counting means.

4,882,721

OFFSET FOR PROTECTION AGAINST AMORPHOUS PIPS

Roger R. Bracht, Colorado Springs, Colo., and Johannes J. Verboom, Bergeyk, Netherlands, assignors to Laser Magnetic Storage International Company, Colorado Springs, Colo.

Continuation of Ser. No. 578,150, Feb. 8, 1984, abandoned, and a continuation of Ser. No. 897,681, Aug. 18, 1986, abandoned.
This application Feb. 24, 1988, Ser. No. 163,156
Int. Cl.[4] G11B *27/36*
U.S. Cl. 369—54 **6 Claims**



1. In an optical recording system including optical means for writing information on an optical recording medium, an improvement for affecting an amorphous pip representative of a portion of an optical recording medium that is in an amorphous state, comprising:
first means for receiving a read signal representative of information provided on the optical recording medium, said read signal including a first portion representative of an unchanged portion of the optical recording medium and a second portion having a pip representative of at least one of the following: a hole and an amorphous portion of the optical recording medium; and
second means communicating with said first means for inputting an offset signal to said first means, said offset signal being representative o: a pip produced by an amorphous portion of the optical recording medium;
wherein said first means includes means, using said offset signal, for affecting said second portion of said read signal and not other portions of said read signal, in order to

prevent said second portion from being detected as a pip due to a hole when it is a pip due to an amorphous portion.

4,882,722

FRONT LOADING DISK PLAYER

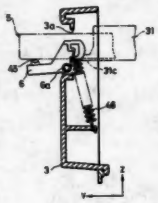
Ryo Matsuura; Nobuyuki Isobe, and Masao Kase, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Continuation of Ser. No. 102,219, Sep. 29, 1987, abandoned. This application Apr. 10, 1989, Ser. No. 334,765

Claims priority, application Japan, Sep. 29, 1986, 61-230724; Sep. 29, 1986, 61-230725

Int. Cl.[4] G11B *15/30, 15/44*

U.S. Cl. 369—75.2 **3 Claims**



1. A front loading disk player comprising:

a housing;

a unitary carrier for bearing a disk to be displayed;

carrier conveying means for conveying said carrier out of and into said housing through an opening formed in said housing, to permit the loading and unloading of said desk; and

a door swingably provided to open and close said opening, said door being spring biased in the closed direction,

said carrier conveying means comprising movable members having cammed grooves contained therein, said movable members being movably provided in said housing;

drive force applying means for applying a drive force to said movable members; and

carrier moving means slidably connected to said cammed grooves of said movable members for moving said carrier horizontally and vertically with movement of said movable members,

said door being opened and closed by said carrier conveying means wherein said door has a low friction member disposed thereon which abuts against said carrier such that when said carrier is conveyed into said housing said door being spring biased in the closing direction abuts against said carrier so as to be closed at the same rate of speed in which said carrier is conveyed such that said door is closed in a smooth manner.

4,882,723

DEVICE FOR OPTICALLY SCANNING A ROTATING DISC

Gerard E. Van Rosmalen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 15, 1988, Ser. No. 209,454

Claims priority, application Netherlands, Jun. 30, 1987, 8701526

Int. Cl.[4] G11B *3/10, 3/32; G02B 7/04*

U.S. Cl. 369—256 **10 Claims**

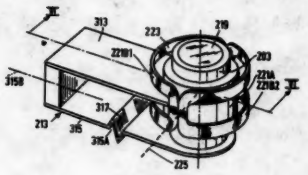
1. A device for directing a radiation beam towards a recording surface of a rotating disc for recording and/or scanning a recording track without mechanical contact, comprising

a frame,

an objective holder comprising an objective with an optical axis,

two elongate leaf springs which are arranged one above the other viewed along the optical axis of the objective and which have their ends secured to the frame and to the objective holder, to allow movements of the objective along the optical axis, and

an electromagnetic acturator comprising first actuator means secured to the objective holder and second actuator means secured to the frame, which means cooperate electromagnetically with one another via an air gap for the controlled movement of the objective, characterized in that



at least one of the leaf springs is elastically extensible in its longitudinal direction to allow pivotal movements of the objective about a pivotal axis which is oriented transversely of a plane containing the optical axis and intersecting the leaf springs, and

the actuator is adapted to provide the driving force for said pivotal movements.

4,882,724

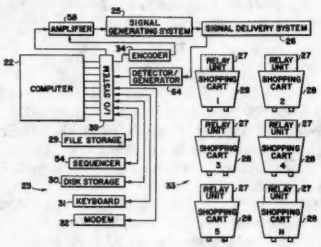
SHOPPERS COMMUNICATION SYSTEM AND PROCESSES RELATING THERETO

Leo Vela, III Grove Isle Dr., Suite 1610, Coconut Grove, Fla. 33133; Thurman Sasser, 1826 Sarazan Dr., Orlando, Fla. 32808, and Roger L. Martin, 1456 Farmington Dr., Deltona, Fla. 32725

Filed Oct. 14, 1987, Ser. No. 108,437

Int. Cl.[4] G06K *15/18*

U.S. Cl. 364—401 **66 Claims**



1. A communication system for communicating with shoppers in a marketing area that is provided with a plurality of shopping carts for use in carrying items selected for purchase comprising

(a) a plurality of message relay units that are supported on and movable with the respective shopping carts about the marketing area, and

(b) means located apart from said units for generating message bearing light signals which are receivable by said units;

each of said message relay units having

(1) a message transmission system for transmitting messages borne by said message bearing light signals and having a video display device for transmitting visually displayable messages borne by signals generated by said means,

(2) a computer connected with the video display device for controlling the operation of the video display device and

(3) a signal receiver system connected with the computer for receiving said message bearing light signals.

4,882,725

MULTIPLEX TRANSMISSION METHOD AND APPARATUS

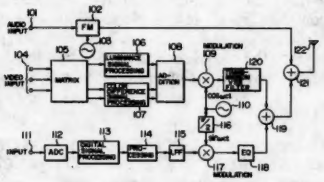
Tsutomu Noda; Takatoshi Shirosugi, both of Yokohama; Nobutaka Hotta, Kamakura, and Akihide Okuda, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Video Engineering, Incorporated, Yokohama, both of, Japan

Filed Jan. 29, 1988, Ser. No. 150,203

Claims priority, application Japan, Jan. 30, 1987, 62-18359; Jan. 30, 1987, 62-18360; Jan. 30, 1987, 62-18398; Jan. 30, 1987, 62-18399; Jul. 29, 1987, 62-187510

Int. Cl.[4] H04J 9/00

U.S. Cl. 370—11 50 Claims



1. A multiplex transmission system comprising a carrier signal source; means for amplitude-modulating and transmitting the carrier signal from said carrier signal source; and a multiplex transmission system including a source of a quadrature signal having a quadrature phase with respect to the carrier signal, means for modulating the quadrature signal by a multiplex signal so as to perform spectrum suppression processing for suppressing at least multiplex signal components located near the carrier signal frequency, means for combining the quadrature signal with the amplitude-modulated carrier signal, means for transmitting the thus combined signal, and means for delaying the multiplex signal by a fixed time, said means for modulating including means for applying waveform computation processing to the delayed multiplex signal and to the non-delayed multiplex signal.

4,882,726

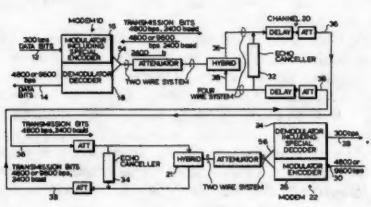
FULL DUPLEX MODEM SYSTEM FOR DIFFERING DATA BIT RATES

Gordon R. Lang, Bolton, and Fred M. Longstaff, Islington, both of Canada, assignors to Motorola Canada Limited, North York, Canada

Filed Nov. 23, 1987, Ser. No. 123,941

Int. Cl.[4] H04B 1/56, 1/50; H04J 3/22

U.S. Cl. 370—24 18 Claims



1. In a communication system:

a pair of full duplex modems connected by a channel,

each modem being designed to transmit to the other at the same predetermined baud rate,

one of said modems being designed to receive a first series of data bits at a predetermined first rate for transmission over said channel and to transmit said received bits as first transmission bits over said channel as an integral number of first transmission bits per baud,

the other of said modems being designed to receive a second series of data bits at a data bit rate slower than the predetermined baud rate, for transmission over said channel,

means forming part of said other modem for sequentially encoding blocks of said second series of data bits in blocks into a larger number of second transmission bits for transmission over said channel at an integral number of second transmission bits per baud

means forming part of said one modem for decoding said second transmission bits into said second series of data bits.

4,882,727

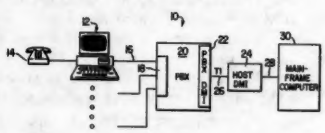
ADAPTIVE DIGITAL NETWORK INTERFACE

Stephen J. Williams, Denver, Colo., and Elden D. Traster, Richardson, Tex., assignors to Aristacom International, Inc., San Francisco, Calif.

Filed Mar. 11, 1987, Ser. No. 24,345

Int. Cl.[4] H04J 3/00

U.S. Cl. 370—79 55 Claims



1. A method for transmitting data units over a plurality of channels comprising:

storing a plurality of data bits of a data unit in a first memory, said first memory operable to output individual data bits;

accessing a first instruction stored in a program memory;

transmitting a data bit or a non-data bit;

counting the number of data bits output from said first memory on a first channel;

generating a first binary control signal when the number of data bits transmitted from said first memory equals a first predetermined value;

counting the number of bits transmitted on a first channel, said number of bits including data bits output from said first memory and non-data bit transmitted on said first channel;

generating a second binary control signal when the member of bits transmitted on said first channel equals a second predetermined value;

sensing the binary value of the next bit to be output from said first memory;

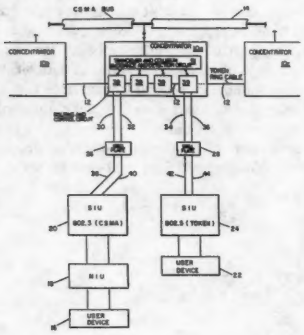
generating a third binary control signal corresponding to the value of said binary value of said next bit; and

accessing a second instruction in said program memory, said second instruction located at an address determined by combining predetermined address bits with said binary control signals in a predetermined pattern.

4,882,728
NETWORKING CIRCUITRY

Alexander Herman, Sharon, Mass., assignor to Codex Corporation, Mansfield, Mass.

Continuation of Ser. No. 634,400, Jul. 25, 1984, abandoned. This application Apr. 7, 1987, Ser. No. 35,505
Int. Cl.[4] H04J 3/02
U.S. Cl. 370—85 24 Claims



1. Apparatus for use in a data communication networking system of the kind in which messages are carried among a plurality of data handling devices over a plurality of different networks, different said devices being adapted for communicating on different said networks, each said device being arranged to communicate by means of electrical signals representative of digital message information, said apparatus comprising:

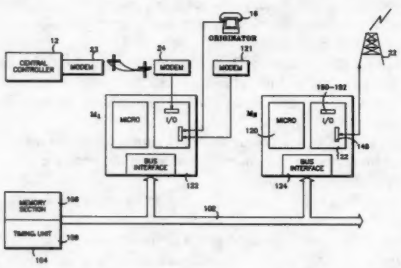
control circuitry for determining, based on characteristics of said electrical signals but without reference to any said digital message information, the network on which said device is adapted to communicate, and

connection circuitry responsive to said control circuitry for enabling said device to communicate on said network.

4,882,729
PAGING CONTROLLER HAVING A MULTIPLEX BUS ARRANGEMENT

Gary S. Lobel, Boynton Beach; Steven J. Goldberg, Coral Springs, and Gerald H. Johnson, Jr., Boynton Beach, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 7, 1988, Ser. No. 225,423
Int. Cl.[4] H04J 3/02
U.S. Cl. 370—85.1 11 Claims



1. In a paging terminal, a system for controlling the processing of real time analog voice messages received from an external source said system comprising:

means for generating a master synchronization signal including a periodic train of sync pulses;

a bus including a plurality of conductors for carrying digital data in a parallel format, and said master synchronization signal;

a plurality of processing modules coupled in parallel to said bus, each processing module operative to process real time analog voice messages in parallel with the other processing modules, each processing module including:

a controller means;

means operatively synchronized to said master synchronization signal to digitize samples of an analog voice message in real time to generate a stream of digital data samples which together represent a digital data replication of said analog voice message, a predetermined number of samples being digitized in an inter-pulse period of said master synchronization signal;

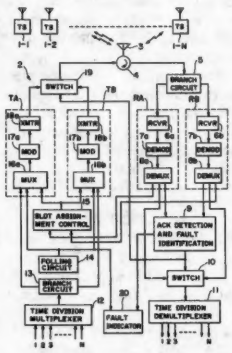
a buffer memory for storing said predetermined number of digital data samples; and

timer means governed by said master synchronization signal to generate an interrupt pulse at a unique time in each inter-pulse period of said master synchronization signal, said controller means responsive to said unique interrupt pulse to transfer within a unique time slot of said inter-pulse period the digital data samples stored in said buffer memory to the parallel digital data conductors of said bus.

4,882,730
TDMA COMMUNICATION SYSTEM HAVING COMMON TIME SLOTS FOR SYSTEM MAINTENANCE

Saburo Shinmyo, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Nov. 30, 1987, Ser. No. 126,561
Claims priority, application Japan, Nov. 28, 1986, 61-283694
Int. Cl.[4] H04J 3/16
U.S. Cl. 370—95.2 5 Claims



1. A demand assignment time division multiple access communication system having a plurality of terminal stations and a central station, comprising:

a pair of first and second time division multiplexed (TDM) transmitting channels for establishing a broadcast channel from said central station to said terminal stations and a pair of first and second TDM receiving channels for establishing individual channels from said terminal stations to said central station on an as needed basis, said first and second TDM receiving channels having inputs coupled together so that when one of the outputs of said receiving channels is coupled to a demultiplexer the other receiving channel is in a hot-standby state;

a polling circuit for transmitting a polling signal on a common time slot of the broadcast channel for sequentially

polling said terminal stations to permit each of the terminal stations to send an acknowledgement to said central station on a common time slot of the individual channels in response to said polling signal;

a fault identification circuit connected to the outputs of said first and second receiving channels for detecting the presence and absence of said acknowledgment at said central station and detecting acknowledgments received through said first and second receiving channels for determining therefrom which one of said first and second receiving channels is faulty; and

switch means responsive to the output of said fault identification circuit for selectively coupling the outputs of said first and second receiving channels to said demultiplexer.

4,882,731

DATA PROCESSING DEVICE COMPOSED OF FOUR DATA PROCESSING MODULES OF SUBSTANTIALLY IDENTICAL CONSTRUCTION, WITH PROTECTION BOTH AGAINST SIMULTANEOUS SINGLE-BIT FAILURES IN A PLURALITY OF DATA PROCESSING MODULES AND AGAINST FAILURE OF A SINGLE DATA PROCESSIN

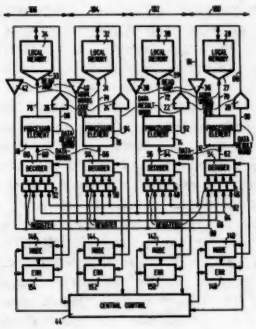
Willibrordus J. van Gils, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 19, 1987, Ser. No. 87,185

Claims priority, application United Kingdom, Sep. 5, 1986, 8621469

Int. Cl.[4] G06F *11/10*

U.S. Cl. 371—37.6 **4 Claims**



1. A data processing device comprising:

(a) four data processing modules (100, 102, 104, 106) which each include

(i) corresponding data processing means (12, 14, 16, 18) having a data path width of at least 2n bytes, where n is an integer greater than or equal to one,

(ii) a respective encoder module (20, 22, 24, 26) fed by the corresponding data processing means for bytewise encoding a processing result of 2n bytes to a respective encoding result of n bytes,

(iii) a respective memory module (28, 30, 32, 34) fed by the respective encoder module for storing the respective encoding result, P2 (iv) respective input decoders (54, 56, 58, 60) for receiving said encoding results in groups of four bytes and therefrom reconstituting a two-byte data word representing said processing result for presentation to the corresponding data processing means,

(b) an interconnection network ((82, 84, 86, 88) fed by the respective data processing modules for applying encoding results between all data processing modules and the respective input decoders,

(c) mode register means for controlling said input decoders so that they assume respective first, second and third modes, so that

(i) in the first mode, said input decoders accept and digest all bytes of one of said groups,

(ii) in the second mode, the input decoders accept and digest three bytes of one of said groups but reject an associated fourth byte of said group, there being four possible modes designated the second mode, and

(iii) in the third mode, the input decoders accept and digest two bytes of one of said groups but reject an associated combination of two remaining byes of said group, there being six possible modes designated the third mode, and

wherein

said encoder modules multiply each byte of a data word by a regular matrix and add the multiplication bytes to produce a code byte, the four code bytes thus generated by the respective encoder modules constituting a code word, of a code with a minimum Hamming distance over the bits of seven, the three code bytes accepted in any second mode constituting a partial code word with a minimum Hamming distance over the bits of four, the two bytes accepted in any third mode constituting a representation of all bits of the associated processing result.

4,882,732

METHOD AND APPARATUS FOR RECORDING AND/OR REPRODUCING DIGITAL DATA

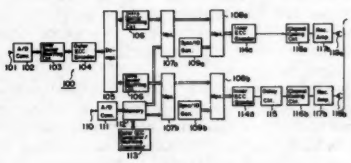
Kouzou Kaminaga, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Nov. 3, 1987, Ser. No. 116,208

Claims priority, application Japan, Nov. 5, 1986, 61-263021

Int. Cl.[4] G06F *11/10*

U.S. Cl. 371—2.2 **8 Claims**



1. A method of recording digital data comprising the steps of:

receiving a series of digital data;

dividing said series of digital data into a plurality of segments each including a first predetermined number of data symbols;

alternately distributing the data symbols of each of said segments into two respective sectors;

shuffling the data symbols in each sector according to a predetermined pattern;

generating an outer error correction code block including a first predetermined number of redundancy symbols for each of said sectors;

generating an inner error correction code block including a second predetermined number of redundancy symbols for each of said sectors; and

recording said series of digital data with said redundancy symbols of said outer error correction code block and said inner error correction code block on slant tracks of a tape recording medium, said redundancy symbols of said outer error correction code block being recorded first, at the beginning of each of the slant tracks, and being followed by said data symbols and said redundancy symbols of said inner error correction code block on each of the slant tracks, whereby errors are more likely to affect said redundancy symbols of said outer error correction code block than other portions of said digital data and said

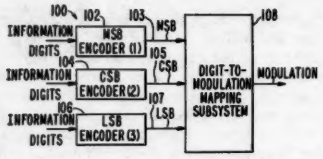
other portions of said digital data have a reduced error rate.

4,882,733

METHOD AND APPARATUS FOR COMBINING ENCODING AND MODULATION

Robert M. Tanner, Capitola, Calif., assignor to Ford Aerospace Corporation, Detroit, Mich.

Filed Mar. 13, 1987, Ser. No. 25,768
Int. Cl.[4] G06F 11/10
U.S. Cl. 371—43 20 Claims



1. In a digital signal communication system for communicating information through an information channel, a method for combined coding and modulation of digital information comprising the steps of:

indexing digital signals representative of elementary modulations by indexing vectors to create a decomposition of indexing vectors of an index vector space into a plurality of ordered subspaces, including binary and nonbinary subspaces;

associating with each said indexing vector a Euclidean distance in modulation space such that any two modulations whose indexing vectors differ only by a distance vector contained in a first subspace and any preceding (higher significant) subspaces of the series of ordered subspaces are separated in said modulation space by at least said Euclidean distance; and

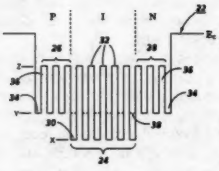
encoding information signals by encoders employing error-correcting codes, each said encoder producing a symbol representative of an indexing vector of the same dimension as a corresponding one of said ordered subspaces for communication of said symbol through said information channel.

4,882,734

QUANTUM WELL HETEROSTRUCTURE LASERS WITH LOW CURRENT DENSITY THRESHOLD AND HIGHER T_O VALUES

Donald R. Scifres, Los Altos Hills, Calif., and Robert D. Burnham, Wheaton, Ill., assignors to Xerox Corporation, Stamford, Conn.

Filed Mar. 9, 1988, Ser. No. 165,862
Int. Cl.[4] H01S 3/19
U.S. Cl. 372—45 16 Claims



1. In a quantum well heterostructure laser exhibiting low current density threshold and high T_0 values, said laser comprising

a plurality of contiguous semiconductor layers formed on a substrate,

one or more said layers forming an active region capable of quantization of electron states,

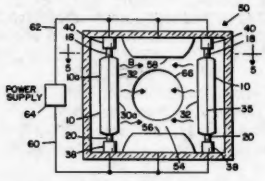
said active region confined by a pair of outer superlattice regions providing optical confinement and low thermal resistance while preventing the development of antiwaveguiding properties.

4,882,735

MODULAR UV PREIONIZATION PACKAGE FOR A CO_2 LASER

Michael P. Altman, Washington Mills, N.Y., assignor to United Technologies Corporation, East Hartford, Conn.

Filed Dec. 1, 1988, Ser. No. 279,126
Int. Cl.[4] H01S 3/097
U.S. Cl. 372—86 19 Claims



1. A CO_2 gas laser comprising:

means for defining a resonant cavity structure, said resonant cavity structure including a lasant gas comprised of CO_2, said lasant gas being substantially devoid of N_2 for substantially eliminating a generation of a parasitic optical tail pulse during an operation of said CO_2 gas laser;

means for generating an electrical discharge within said resonant cavity structure for ionizing said lasant gas such that said lasant gas emits electromagnetic radiation; and

means for preionizing said lasant gas with ultraviolet radiation, said preionizing means comprising at least one sealed module means containing a gas comprised of N_2, said sealed module means substantially isolating said N_2 gas from said lasant gas, said sealed module means comprising means for ionizing said N_2 gas such that said N_2 gas emits ultraviolet radiation, said ionizing means being coupled to electrical terminal means extending through an outer surface of said sealed module means, said preionizing means further comprising electrical coupling means adapted for conductively coupling to said electrical terminal means such that said sealed module means is removably coupled to said laser, and wherein

said module means further comprises window means comprised of a material substantially transparent to ultraviolet radiation for coupling ultraviolet radiation emitted by said N_2 gas to said lasant gas.

4,882,736

METHOD FOR EFFICIENTLY USING FLUE GAS ENERGY IN A GLASS FURNACE

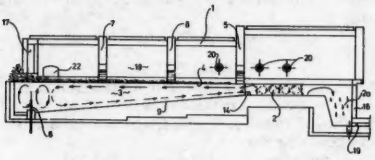
Helmut Pieper, Lohr am Main, Fed. Rep. of Germany, assignor to Sorg GmbH & Co. KG, Lohr am Main, Fed. Rep. of Germany

Filed May 18, 1988, Ser. No. 195,514
Claims priority, application Fed. Rep. of Germany, May 30, 1987, 3718276
Int. Cl.[4] C03B 5/027
U.S. Cl. 373—32 16 Claims

1. A method for melting glass in a glass melting furnace comprising:

a. feeding a charge into a charging end of a melting section of the furnace;

b. clarifying melted charge in a clarifying section adjoining the melting section;
c. homogenizing the clarified melted charge in a homogenization section adjoining the clarifying section;
d. withdrawing the homogenized material from the homogenization section;
e. adding energy through electrodes under the charging end;
f. adding most of the input of melting energy by burners disposed above the melt in the clarifying section, the burners producing flue gases;
g. absorbing flame radiation from the clarifying section at its



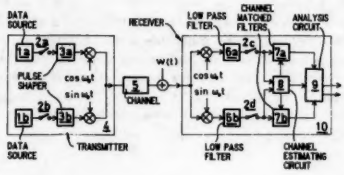
boundary with the melting section and above the melting section;
h. dividing the space above the melt into zones of different temperature in which the highest temperature is in the clarifying section;
i. preheating combustion air by heat exchange with the flue gases;
j. feeding the preheated combustion air into said burners;
k. passing the flue gases across the melting section countercurrently to the charge;
l. exhausting the flue gases from the furnace near the charging end.

4,882,737

SIGNAL TRANSMISSION METHOD

Dacfey Dzung, Wiirenlos, Switzerland, assignor to BBC Brown Boveri AG, Baden, Switzerland

Filed Jul. 15, 1988, Ser. No. 219,343
Claims priority, application Switzerland, Jul. 31, 1987, 2951/87
Int. Cl.[4] H03H *17/00*; H04J *11/00*; H04L *23/02*
U.S. Cl. 375—15 **6 Claims**



1. Signal transmission method according to the principle of quadrature amplitude modulation, comprising the steps of:
in a transmitter
(a) sampling digital data in predetermined time intervals T;
(b) forming a transmit signal by feeding the digital data to a pulse shaper, said pulse shaper having a given unit pulse response r(t);
(c) amplitude-modulating a carrier oscillation by the transmit signal;
(d) transmitting said amplitude-modulated carrier oscillation via a channel, said channel having a unit pulse response h(t) and superimposing an additive white noise w(t);
in a receiver
(e) demodulating the transmitted carrier oscillation into a receive signal y(t);
(f) sampling said receive signal in time intervals ΔT which are small in relation to the time interval T;
(g) preprocessing said sampled receive signal in a transverse channel-matched filter, said channel-matched filter being matched to a filter cascade H(t) formed by said pulse shaper and said channel as a whole,

$$H(t)=h*r(t),$$

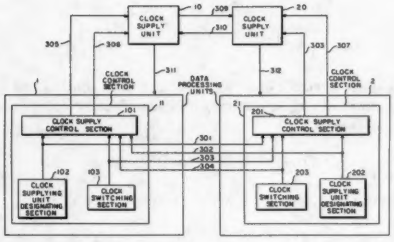
where "*" stands for the convolution product; and
(h) determining original digital data from the preprocessed sampled receive signal in an analysis circuit.

4,882,738

CLOCK CONTROL SYSTEM

Takashi Suzuki, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jun. 24, 1988, Ser. No. 211,281
Claims priority, application Japan, Jun. 25, 1987, 62-156492
Int. Cl.[4] H04L *1/00*
U.S. Cl. 375—108 **4 Claims**



1. A clock control system comprising:
a plurality of data processing units, and
a plurality of clock supplying units,
each of said clock supplying units comprising:
a plurality of clock generating means for generating a plurality of clock signals differing from one another in frequency, and
clock selecting means for selecting a clock signal from either said plurality of clock signals or from a second clock supplying unit; and
each of said data processing units comprising:
unit designating means for designating a clock supplying unit from which to receive a clock signal,
clock switchover ordering means for ordering a switchover from a clock signal currently in use to another of said plurality of clock signals, and
selecting/controlling means, responsive to instructions from said unit designating means and from said clock switchover ordering means, for selecting and controlling one of said plurality of clock generating means.

4,882,739

METHOD FOR ADJUSTING CLOCKS OF MULTIPLE DATA PROCESSORS TO A COMMON TIME BASE

Richard J. Potash, Dedham, Mass., and Steven K. Burns, Durham, N.H., assignors to Computer Sports Medicine, Inc., Cambridge, Mass.

Filed Jan. 26, 1988, Ser. No. 148,493
Int. Cl.[4] H04L *7/00*
U.S. Cl. 375—109 **33 Claims**

1. A method for referencing at least one slave clock to a master clock, said master clock providing a master clock time

signal, said slave clock providing a periodically incremented slave clock time signal, said method comprising the steps of:

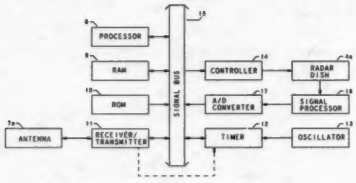
(1) transmitting from said slave clock to said master clock a first time signal having a value ST_0 corresponding to the value of said slave clock time signal when said first time signal is transmitted;

(2) determining a value MT_0 of said master clock time signal when said first time signal is received by said master clock;

(3) subsequently transmitting from said master clock to said slave clock a second time signal having the value MT_0;

(4) subsequently transmitting from said master clock to said slave clock a third time signal having a value MT_1 corresponding to the value of said master clock time signal when said third time signal is transmitted;

(5) determining a value ST_1 of said slave clock time signal when said third time signal is received by said slave clock;



(6) upon receipt of said second and third time signals at said slave clock, determining a virtual clock reference time t_{ref} given by

$$t_{ref}=[(MT_0+MT_1)-(ST_0+ST_1)*k_{clkratio}]/2$$

where $k_{clkratio}=(MT_1-MT_0)/(ST_1-ST_0)$; and

(7) at said slave clock, generating a virtual clock time signal having a value T_{vc} synchronized to said master clock time signal, the value T_{vc} of said virtual clock time signal being given by

$$T_{vc}=t_{ref}+n_{pc}*k_{clkratio}$$

where n_{pc} is the number of slave clock time signal increments.

4,882,740

FREQUENCY COUNTER FOR COUNTING A FREQUENCY AND PARTLY VARIED FREQUENCIES OF A SIGNAL IN REAL TIME

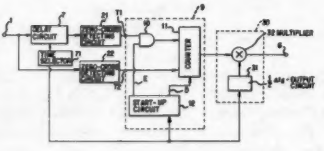
Yoshitaka Abe, and Keiichi Murakami, both of Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Feb. 25, 1988, Ser. No. 160,227

Claims priority, application Japan, Mar. 16, 1987, 62-60417

Int. Cl.[4] G01R *23/10*

U.S. Cl. 377—49 **3 Claims**



1. A frequency counter for counting a frequency of an input signal, said frequency counter, comprising:

delaying means for delaying the input signal as much as a predetermined time and for producing a delayed signal, said predetermined time being selectable so as to be longer than a half period of the frequency of the input signal;

first detecting means for detecting delayed zero-cross pulses from said delayed signal;

second detecting means for detecting zero-cross pulses from the input signal; and

difference detecting means for counting a first number of said delayed zero-cross pulses after said predetermined time is over and a second number of said zero-cross pulses during the predetermined time and after the predetermined time is over, and for detecting difference between said first and second numbers by subtracting said first number from said second number from moment to moment.

4,882,741

MULTILEAF COLLIMATOR AND RELATED APPARATUS

Kevin J. Brown, Crawley, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 26, 1988, Ser. No. 263,090

Claims priority, application United Kingdom, Oct. 28, 1987, 8725253

Int. Cl.[4] G21K *1/04*

U.S. Cl. 378—152 **10 Claims**

1. A collimating arrangement for a beam of radiation, comprising a set of mutually contiguous members which substantially attenuate said radiation, means for adjusting the positions of the members so that edges thereof form an adjustable aperture for defining the cross-sectional shape of the beam, illuminating means for illuminating an area including the beam-defining edges of said members, and detecting means responsive to spatial variations in the intensity of illumination reaching the detecting means from said area for determining the positions of said beam-defining edges, wherein each of said members includes respective retroreflector means for reflecting illumination from the illuminating means into the detecting means substantially independently of the position in said area of said beam-defining edges of said members, and the detecting means are more responsive to the higher intensity of illumination reflected from the retroreflector means than reflected from adjacent regions in said area so as to detect the positions of the retroreflector means which are respectively representative of the positions of said edges of said members.

4,882,742

METHOD FOR MEASURING RESISTANCES, IN PARTICULAR RESISTANCES OF SUBSCRIBER'S LINES OF DIGITAL TIME DIVISION MULTIPLEX TELECOMMUNICATION NETWORKS

Wolfgang Kaiser, Munich, and Werner Schmutzler, Fuerstenfeldbruck, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 8, 1988, Ser. No. 229,575

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1987, 3726882

Int. Cl.[4] H04B *3/46*; H04M *1/24*

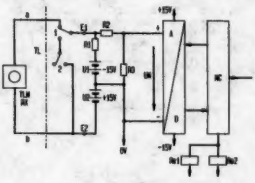
U.S. Cl. 379—30 **2 Claims**

1. A method for measuring resistances, in particular the resistance of a subscriber's line in a digital time division multiplex telecommunication network, using a measuring circuit and a signal processor, which drives the measuring circuit and

determines the corresponding resistance values from the values of the voltages supplied as measuring results by the measuring circuit, said method comprising the steps of:

carrying out a first and a second preliminary measurement before each actual resistance measurement with the measuring circuit input terminals operating at no-load and short-circuit respectively;

forming a weighting factor as the quotient of the difference between calculated voltage values corresponding to the first and second preliminary measurements, respectively,



and the difference between the first and second preliminary measurements;

carrying out an actual resistance measurement with the measuring circuit input terminals coupled to said subscriber's line; and

weighting the difference between the value of the voltage supplied by the measuring circuit in said actual resistance measurement and said second preliminary measurement with said weighting factor and converting the weighted value into the resistance value of the measured resistance.

4,882,743

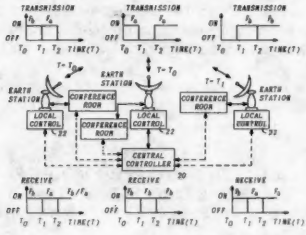
MULTI-LOCATION VIDEO CONFERENCE SYSTEM

M. Fatein Mahmoud, Middletown, N.J., assignor to American Telephone and Telegraph, New York, N.Y. and AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 1, 1988, Ser. No. 226,491

Int. Cl.[4] H04M *11/00*; H04N *7/14*

U.S. Cl. 379—53 **8 Claims**



1. A method for establishing video-audio communications between more than two remotely located conference rooms characterized by

designating one of the conference rooms to be the director's conference room,

assigning a broadcast satellite channel to broadcast from any one of the conference rooms to all other conference rooms,

assigning an auxiliary satellite channel to transmit from any one of the other conference rooms to the room assigned to the broadcast satellite channel,

using frequency division multiple access satellite transmission of the broadcast channel and the auxiliary channel, and

using public switch network lines to transmit control signals from the director's conference room to satellite modulators-demodulators (modems) located at earth stations via a video teleconferencing switching controller and a monitor and remote controller at each earth station coupled to selectively tune the modulators to said broadcast channel or said auxiliary channel, and to selectively tune the demodulators to one of the two channels, and to selectively turn the modulators on or off.

4,882,744

AUTOMATIC PAGING SYSTEM

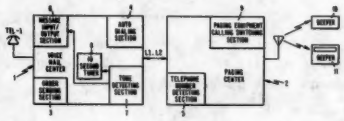
Kazuo Hashimoto, Tokyo, Japan, assignor to Hashimoto Corporation, Tokyo, Japan

Filed Aug. 17, 1988, Ser. No. 233,279

Claims priority, application Japan, Aug. 18, 1987, 62-204842

Int. Cl.[4] H04Q *7/04*

U.S. Cl. 379—57 **2 Claims**



1. An automatic paging system which can handle calls for both subscribers of a first type beeper without message display capability and a second type beeper with message display capability, comprising:

means at a voice mail center which executes a paging service, for detecting (a) an outgoing message which is sent back to a calling party from a paging center when a number of the first type beeper is dialed by the voice mail center, and (b) a first accompanying specific signal;

means at the voice mail center, for detecting (a) an outgoing message which is sent back to the calling party when a number of the second type beeper with message display capability is dialed by the voice mail center, and (b) a second accompanying specific signal;

switching means in the voice mail center for switching to first and second states according to whether the outgoing message from the paging center is for said first or second type of beeper, respectively;

means for disengaging a line in a predetermined fixed time duration after dialing when said switching means is in said first state corresponding to the first type beeper; and

means for disengaging the line after the calling party sends out his telephone number or other message when the outgoing message for said second type beeper with message display capacity is delivered when the switching means is in the second state.

4,882,745

CORDLESS HEADSET TELEPHONE

Alan H. Silver, 130 NE. 41st St., Apt. #8, Ft. Lauderdale, Fla. 33334

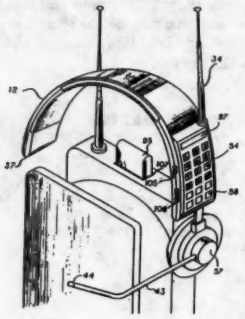
Continuation of Ser. No. 50,700, May 8, 1987, abandoned. This application Mar. 20, 1989, Ser. No. 325,071

Int. Cl.[4] H04Q *7/04*

U.S. Cl. 379—61 **26 Claims**

1. A cordless headset telephone system comprising: at least one headset and at least one base, each including transmitter means and receiver means for providing a two-way cordless transmission between the headset and the base, each headset being balanced and having a minimum inertial moment, and including a curved headband, a quick-disconnect battery pack attached to one end portion of the headband, a single earpiece attached to the other end portion of the headband, and a microphone respectively connected to a headset receiver and a

headset transmitter, a forwardly extendable microphone arm having the headset microphone mounted thereon, each base



having a base receiver and base transmitter respectively connected to an audio output and an audio input.

4,882,746

CORDLESS TELEPHONE SYSTEM

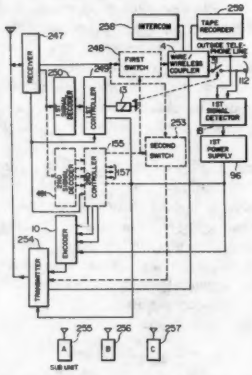
Masatoshi Shimada, 6-12, Todoroki-3-chome, Setagaya-ku, Tokyo, Japan

Filed Mar. 17, 1988, Ser. No. 169,466

Claims priority, application Japan, Mar. 22, 1987, 62-68772; May 1, 1987, 62-106266; May 29, 1987, 62-131487; Sep. 7, 1987, 62-221839

Int. Cl.[4] H04M *11/00*

U.S. Cl. 379—61 **22 Claims**



1. A cordless telephone system comprising:

a master unit connected to a telephone line and having a radio transceiver;

at least one sub-unit having a radio transceiver and which is capable of transmitting and receiving speech to and from the telephone line through the master unit; and

control means responsive to a control signal from said sub-unit, said control means including at least one of: transfer control means for permitting transfer of speech on said telephone line from one sub-unit to another sub-unit, speech control means for permitting speech between sub-units through the master unit, and equipment control means for controlling equipment other than the telephone line by said sub-unit.

4,882,747

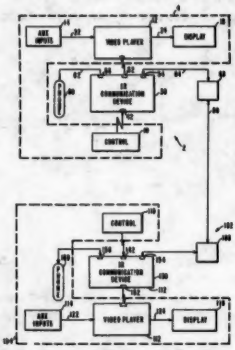
INFRARED COMMUNICATION APPARATUS FOR REMOTE SITE APPLICATIONS

Jerry Williams, 4087 Norton Ave., Oakland, Calif. 94602

Filed May 12, 1988, Ser. No. 193,016

Int. Cl.[4] H04M *11/00*

U.S. Cl. 379—102 **7 Claims**



1. A communication system comprising:

a first infrared control unit at a first site;

a video display system under control of an infrared signal transmitted by said first control unit;

a second infrared control unit at a second site;

a second video display system under control of an infrared signal transmitted by said second control unit; and

a first infrared communication device at said first site and a second infrared communication device at said second site, each said infrared communication device comprising:

an infrared receiver for receiving an infrared control signal from the control unit at its site;

a microprocessor for decoding said received control signal to generate digitized control signals;

an infrared transmitter for retransmitting a regenerated infrared control signal to the display system at its site;

a modem for communicating and receiving digitized control signals over phone communication lines to the other site; and

a phone at each site for establishing a phone line communication link for said modem with said other site.

4,882,748

HOMOLOGATED PROTECTOR MODULES FOR TELEPHONE CONNECTOR BLOCKS

Carl Meyerhoefer, Dix Hills, N.Y., assignor to Porta Systems Corp., Syosset, Del.

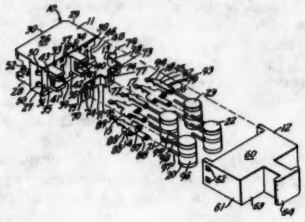
Filed Sep. 30, 1988, Ser. No. 251,231

Int. Cl.[4] H02H *9/06*

U.S. Cl. 379—332 **6 Claims**

6. In a combination telephone subscriber circuit connector block and a protector module therefor, the improvement comprising: said conntector block having an exposed planar surface, a plurality of insulation displacing wire terminals thereon projecting from said surface, a grounding strip carried by said surface and extending medially thereon; said module comprising a base element, a hollow cover element engaged upon said base element to define an elongated cavity, a perforate grounding element supported transversely with respect to said base element and having a free end forming a terminal extending outwardly of said base element; a plurality of elongated axially oriented contacts positioned within said cavity, and having first ends penetrating said base element to contact said insulation displacement terminals on said block, and second ends

having socket forming means thereon; and a plurality of protective elements having means thereon engaging said socket



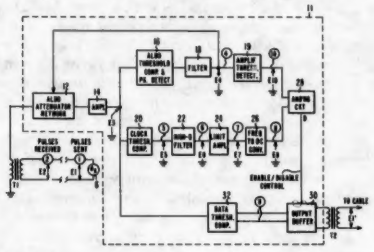
forming means; said free end of said grounding element extending outwardly of said base element and resiliently contacting said grounding strip.

4,882,749

CONTROL OF SIGNAL TRANSMISSION

Borys Zuk, New Brunswick, N.J., assignor to Harris Semiconductor (Patents) Inc., Melbourne, Fla.

Filed Jan. 9, 1986, Ser. No. 817,489
Int. Cl.[4] H04B *3/36*
U.S. Cl. 379—346 **4 Claims**



1. A telephone cable repeater comprising:

input means for receiving signals from one section of a telephone cable;

amplitude and frequency responsive means, coupled to said input means, including:

(a) a first means responsive to the amplitude of the signals received at said input means for producing a first signal having a first value when the amplitude of said received signals is above a preset level and having a second value when its amplitude is below said preset level; and

(b) a second means responsive to the frequency of the signals received at said input means for producing a second signal having a first value when the frequency of said signals received at said input means is within a predetermined range and having a second value when the frequency of said signals received at said input means is outside said predetermined range;

said amplitude and frequency responsive means also including means for producing an enabling signal when the amplitude of said signals is greater than said preset level and the frequency of said signals received at said input means is within said predetermined frequency range; and

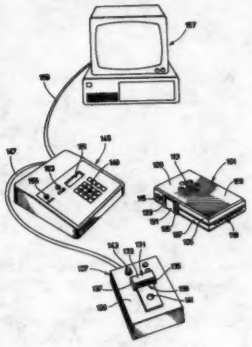
selectively enabled output means responsive to said enabling signal and to the signals received at said input means for producing regenerated signals for transmission to a subsequent section of telephone cable.

4,882,750

PROGRAMMABLE DIALER SYSTEM

Daniel A. Henderson, P.O. Box 110624, Arlington, Tex. 76094, and William T. Mostyn, Jr., P.O. Box 457, Waco, Tex. 76643

Filed Mar. 23, 1988, Ser. No. 172,137
Int. Cl.[4] H04M *1/26*
U.S. Cl. 379—355 **22 Claims**



1. A portable telephone dialer for producing a sequence of dual tone modulated frequencies corresponding to a telephone number during a dialing mode adapted to be preprogrammed with a telephone number by a programming unit having a plurality of programming probes during a programming mode, comprising:

a case having at least one surface for substantially enclosing a small volume;

a dual tone modulated frequency generating integrated circuit, disposed within said case having last number redial capability and at least one redial input contact for actuating said last number redial capability, said dual tone modulated frequency generating integrated circuit including a reprogrammable memory of the type capable of storing a sequence of digits, and a signal generator for producing a sequence of dual tone modulated frequency signals corresponding to said sequence of digits stored in said memory;

a programming interface means, electrically coupled to said reprogrammable memory, for releasably electrically coupling said reprogrammable memory with said plurality of programming probes of said programming unit during said programming mode;

an audiofrequency output means coupled to said signal generator for producing a sequence of audible audiofrequency signals corresponding to said sequence of dual tone modulated frequency signals produced by said signal generator during said dialing mode;

at least one battery disposed within said case and electrically coupled to said reprogrammable memory means, said signal generator, and said audiofrequency output means, for providing power to said memory means, said signal generator, and said audiofrequency output means; and

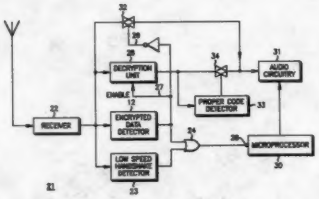
a single bi-state, switch electrically coupled to said at least one redial input contact and operable from the exterior of said case for activating said last number redial capability and causing said signal generator to produce said sequence of dual tone modulated frequency signals corresponding to said digits stored in said preprogrammed memory wherein, subsequent to programming, said portable telephone dialer is operable exclusively through said last number redial capability, restricting said portable telephone dialer to dialing said sequence of digits stored in said reprogrammable memory.

4,882,751

SECURE TRUNKED COMMUNICATIONS SYSTEM

Michael D. Kotzin, Buffalo Grove; Kenneth J. Zdunek, and Eric F. Ziolko, both of Schaumburg, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 31, 1986, Ser. No. 926,311
Int. Cl.[4] H04K 1/00
U.S. Cl. 380—9 **13 Claims**



10. A subscriber unit for use in a secure trunked communications system, wherein the secure trunked communications system includes:

at least one central controller having: means for allocating a limited number of communication channels in response to a channel acquisition request from said subscriber unit;

means for maintaining said channel allocation, at least so long as said subscriber unit alternatively provides both of:

a connect tone in conjunction with transmission of an unencrypted signal; and

an encrypted signal transmission comprised of a data stream;

means for terminating said channel allocation upon receiving either of:

a disconnect signal; and

an end of message signal transmitted by said subscriber unit as part of said data stream; and

means for transmitting a handshake signal when said subscriber unit transmits a signal that includes said connect tone; said subscriber unit comprising:

means for transmitting a channel allocation request to said central controller;

means for selectively transmitting a digitally encrypted message as a data stream;

means for automatically attempting to decrypt a received digitally encrypted message comprised of a data stream upon receiving such a signal, and further including means for automatically rendering a decrypted message audible following decryption;

means for automatically transmitting said connect tone in parallel with transmission of a non-encrypted message; and

means for receiving a non-encrypted signal and for automatically rendering said non-encrypted message audible following receipt thereof.

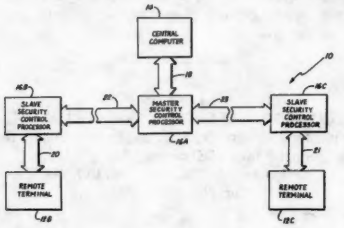
4,882,752

COMPUTER SECURITY SYSTEM

Richard S. Lindman, 3708 17th Ave. South, Minneapolis, Minn. 55407; Richard P. Lindman, 7625 18th Ave. South, Richfield, Minn. 55423, and Edward D. Myers, 4440 Denton Way, Inver Grove Heights, Minn. 55075

Filed Jun. 25, 1986, Ser. No. 878,291
Int. Cl.[4] H04K 1/00
U.S. Cl. 380—25 **32 Claims**

1. A multi-level computer security system of the type having a master access control unit having a master unit database memory for storing codes characteristic of authorized slave access control units and adapted to selectively interface a central computer to a data transmission path and at least one slave access control unit adapted to interface a peripheral unit to the data transmission path, for controlling communications between the peripheral unit and the central computer over the data transmission path and preventing unauthorized access to the central computer; wherein the system is characterized by a first security level procedure at which the slave access control unit transmits a slave unit identification code over the data transmission path to the master access control unit which, when received, is compared by the master access control unit to slave unit identification codes of authorized slave access control units stored in the master unit database memory, and a first security level clearance granted by the master access control unit upon a favorable comparison, and a second security level procedure at which the master access control unit requests from the slave access control unit over the data transmission path a slave unit sync code which must be received over the data transmission path by the master access control unit during a predetermined sync window and which, when



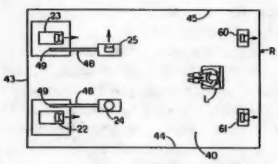
received, is compared by the master access control unit to sync codes of authorized slave units stored in the master unit database memory, and a second security level clearance grated upon a favorable comparison of the received sync code and the sync codes stored in memory if the sync code was received during the sync window, the security system permitting data transmission between the peripheral unit and the central computer through the master and slave access control units and over the data transmission path only if the first and second security clearances are granted, and wherein the master access control unit periodically requests the slave unit sync code from the slave access control unit during data transmission after the first and second security clearance are granted, and terminates data transmission between the peripheral unit and the central computer unless a valid sync code is received during the sync window.

4,882,753

PASSIVE AMBIENCE RECOVERY SYSTEM FOR THE REPRODUCTION OF SOUND

Clarence L. Shivers, 3055 Purgatory Dr., Colorado Springs, Colo. 80918

Continuation-in-part of Ser. No. 145,284, Jan. 19, 1988, Pat. No. 4,837,825, which is a continuation-in-part of Ser. No. 18,357, Feb. 28, 1987, abandoned. This application Jan. 12, 1989, Ser. No. 296,177
Int. Cl.[4] H04R 5/02
U.S. Cl. 381—24 **8 Claims**



1. A multi-channel audio system for producing L and R

stereo signals from an audio source for reception by a listening site proximate the audio source, the system comprising:

first and second speakers arranged in horizontal spaced relation to one another and facing substantially toward the listening site, each speaker producing and directing one of said L and R signals toward the listening site;

third and fourth speakers positioned in front of said first and second speakers, first means for transmitting one of said L and R signals to one of said third and fourth speakers, and second means for transmitting the other of said L and R signals to the other of said third and fourth speakers, one of said L and R signals being transmitted in-phase relation to said third and fourth speakers and the other of said L and R signals being transmitted in out-of-phase relation to said third and fourth speakers to produce a first sound from an out-of-phase signal;

one of said third and fourth speakers directing the sound produced by said in-phase signals at right angles to the sound produced by said out-of-phase signals and directed by the other of said third and fourth speakers;

at least a fifth speaker, the fifth speaker being located behind the listening site and facing away from the listening site, the fifth speaker being connected out-of-phase with the first and second speakers to produce a second sound from an out-of-phase signal;

a first sound-reflective surface facing the first, second and fifth speakers for reflecting the sound produced therefrom;

a second sound-reflective surface oriented at right angles to said first sound-reflective surface and being faced by one of the third and fourth speakers for reflecting the sound produced by said first out-of-phase signal; and

a third sound-reflective surface, perpendicular to the first and second sound-reflective surfaces and being faced by the other of the third and fourth speakers for reflecting the sound produced therefrom;

whereby at least five different signals are produced and directed by said first, second, third, fourth and fifth speakers from different locations and arrive at the listening site at spaced time intervals with respect to one another.

4,882,754

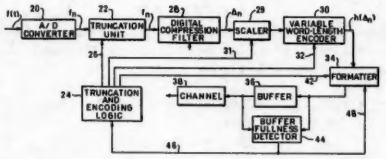
DATA COMPRESSION SYSTEM AND METHOD WITH BUFFER CONTROL

Charles S. Weaver, Palo Alto; Constance T. Chittenden, Los Altos, and Allen B. Conner, Jr., Sunnyvale, all of Calif., assignors to Digideck, Inc., Mountain View and Digital Recording Research Limited Partnership, Menlo Park, both of, Calif.

Continuation-in-part of Ser. No. 89,487, Aug. 25, 1987, Pat. No. 4,802,222. This application Jun. 9, 1988, Ser. No. 204,613

Int. Cl.[4] G10L *5/00*; G11B *5/09*

U.S. Cl. 381—35 **38 Claims**



1. A signal compression system for processing a stream of fixed length digital sample signals comprising,

linear digital compression filter means for compression filtering the digital sample signals and generating a stream of equal length compression filtered signals.

means for truncating digital sample signals supplied to said compression filter means,

variable word length encoding means for encoding the compression filtered stream and generating a stream of encoded signals,

buffer means into which the encoded signal stream is written and from which bits are removed,

wherein the improvement comprises:

means for obtaining a measure of fullness of said buffer means, and

means for controlling the truncating means in response to said measure of fullness to substantially prevent overflow of said buffer means, truncation being increased and decreased with increased and decreased measures of fullness, respectively.

4,882,755

SPEECH RECOGNITION SYSTEM WHICH AVOIDS AMBIGUITY WHEN MATCHING FREQUENCY SPECTRA BY EMPLOYING AN ADDITIONAL VERBAL FEATURE

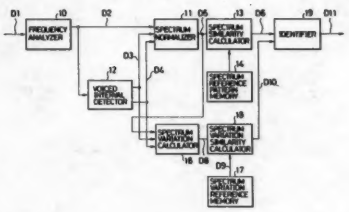
Youichi Yamada, and Keiko Takahashi, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Aug. 11, 1987, Ser. No. 84,107

Claims priority, application Japan, Aug. 21, 1986, 61-196272; Aug. 21, 1986, 61-196274; Sep. 5, 1986, 61-208978

Int. Cl.[4] G10L *7/08*

U.S. Cl. 381—41 **9 Claims**



1. A speech recognition system comprising

a frequency analyzer which performs frequency analysis of the input speech into a number of channels, performs logarithmic conversion and extracts a frequency spectrum,

a voiced interval detector which detects voiced intervals on the basis of the said frequency spectrum,

a spectrum normalizer which determines a least square fit line for the frequency spectrum and normalizes the frequency spectrum with reference to the least square fit line to provide a normalized frequency spectrum pattern,

a spectrum reference pattern memory in which spectrum reference patterns are stored in advance,

a spectrum similarity calculator which calculates the similarity between the said normalized spectrum pattern and a spectrum reference pattern for each of a plurality of recognition categories, and

an identifier which, as the result of the spectrum similarity calculation, outputs the name of the recognition category which has the highest similarity,

the speech recognition system further comprising:

(a) a second feature pattern calculator which calculates a second feature pattern, said second feature pattern calculator (a) including a spectrum variation pattern calculator which, for each frame in a voiced interval, calculates for each channel, as the second feature pattern, a spectrum variation pattern which quantifies the degree and the direction of the transition between channels of the normalized spectrum with the advance of time around the said frame, and

(b) a second feature reference pattern memory in which second feature reference patterns have previously been stored, said second feature reference pattern memory (b) including a spectrum variation reference pattern

memory in which spectrum variation reference patterns, as said second feature reference patterns, have previously been stored, and

(c) a second feature similarity calculator which calculates the similarity between the said second feature pattern and the second feature reference patterns with respect to each recognition category, said second feature similarity calculator (c) including a spectrum variation similarity calculator which calculates the similarity between the said spectrum variation pattern and the spectrum variation reference patterns with respect to each of the recognition categories, and in that

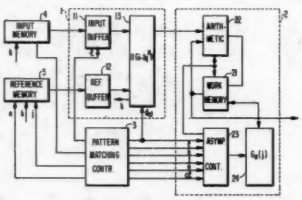
(d) in the identifier, the overall similarity is calculated for each of the recognition categories by reference to both the similarity of the spectrum and the similarity of the second feature, and the category giving the largest overall similarity is output as the recognition result.

4,882,756

PATTERN MATCHING SYSTEM USING DYNAMIC PROGRAMMING

Masao Watari, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 664,732, Oct. 25, 1984, abandoned.
This application Feb. 10, 1989, Ser. No. 308,985
Claims priority, application Japan, Oct. 27, 1983, 58-201385
Int. Cl.[4] G10L *5/06, 9/00*
U.S. Cl. 381—42 **13 Claims**



1. A pattern matching system for deriving the minimum of the dissimilarity defined by the sum of the inter-vector distances $d(a_i, b_j^n)$ of an input pattern $A=a_1, a_2, \cdots, a_I$ expressed by a sequence of feature vectors and an n-th reference pattern $B^n=b_1^n, b_2^n, \cdots$, and b_J^n of a number N of reference patterns stored beforehand on a time function j(i) for establishing correspondence between a time axis i of the input pattern A and a time axis j of the reference pattern B^n, said system comprising:

a pattern matching control unit for gathering a number L of time points i of said input pattern into a block of feature vectors, $1<L<I$, incrementing a block number ii from 1 to I/L, incrementing a signal S_j indicating the time point of said reference pattern for each block number ii, from a lower limit L(ii) to an upper limit U(ii) of a matching region, and incrementing a signal, indicating the time point in one block of said input pattern, from 1 to L;

a distance computation unit including: an input pattern buffer having its address specified by the signal of said control unit; and a reference pattern buffer for temporarily storing the vector b_j^n at the j-th frame of said reference pattern so that said input pattern a_i and said reference pattern b_j^n may be read out from said input pattern buffer and said reference pattern buffer to derive said inter-vector distance $d(a_i, b_j^n)$; and

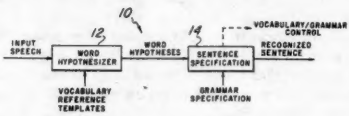
an asymptotic equation computation unit including a dissimilarity memory $G_n(j)$, which has its address specified by said signal j and a signal n of said control unit, so that the asymptotic equation of a dynamic programming is computed for the time point j of each reference pattern and for each time point in one block of said input pattern with reference to said distance $d(a_i, b_j^n)$ under the connecting condition of the dissimilarity $G_n(j)$ at a time point $(ii-1)\cdot L$ for the block number ii of the time point i of said input pattern, thereby to derive the dissimilarity $G_n(j)$ at the time point ii·L of said input pattern.

4,882,757

SPEECH RECOGNITION SYSTEM

William M. Fisher; Michael L. McMahan, both of Plano; George Doddington, Richardson, and Enrico L. Bocchieri, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 856,534, Apr. 25, 1986, abandoned.
This application Jan. 26, 1989, Ser. No. 302,998
Int. Cl.[4] G10L *5/00*
U.S. Cl. 381—43 **22 Claims**



1. A method for selecting a sentence, formed from a sequence of hypothesized words, from a plurality of hypothesized sentences, comprising the steps of:

(a) determining beginning and end points for each hypothesized word in each hypothesized sentence;

(b) determining a word error for each hypothesized word in each hypothesized sentence which indicates a likelihood of the hypothesized word having been incorrectly hypothesized;

(c) determining whether any gaps occur between consecutive hypothesized words in each hypothesized sentence;

(d) assigning error values to any gaps determined in step (c);

(e) determining whether any overlap occurs between consecutive hypothesized words in each hypothesized sentence;

(f) assigning error values to any overlaps determined in step (e);

(g) summing the word errors, gap errors and overlap errors for each hypothesized sentence, and

(h) generating an indicator of the selected sentences as being the hypothesized sentence with the smallest sum as determined in step (g).

4,882,758

METHOD FOR EXTRACTING FORMANT FREQUENCIES

Yutaka Ueksawa, Ashiya; Shuji Takata, Kadoma, and Michiyo Goto, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 22, 1987, Ser. No. 111,346
Claims priority, application Japan, Oct. 23, 1986, 61-252224; Oct. 23, 1986, 61-252220
Int. Cl.[4] G10L *9/04*
U.S. Cl. 381—50 **4 Claims**

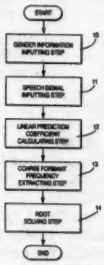
1. A method for extracting a formant frequency comprising the steps of:

calculating linear prediction coefficients by linear prediction analysis of an input speech signal;

extracting a coarse formant frequency by a linear combination of feature parameters of speech obtained by calculation from the speech input signal and previously prepared coefficients; and

solving a root of an inverse filter formed of the linear predic-

tion coefficients by an approximation method in which the coarse formant frequency is used as an initial value of a



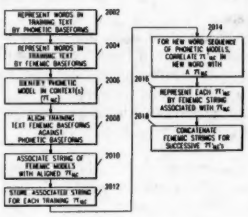
root of the inverse filter and an approximation of a root is recursively calculated until it converges to the root.

4,882,759

SYNTHESIZING WORD BASEFORMS USED IN SPEECH RECOGNITION

Lalit R. Bahl, Amawalk; Peter V. deSouza; Robert L. Mercer, both of Yorktown Heights, and Michael A. Picheny, White Plains, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 18, 1986, Ser. No. 853,525
Int. Cl.[4] G10L *5/00*
U.S. Cl. 381—51 **19 Claims**


REPRESENT WORDS IN TRAINING TEXT BY PHONETIC BASEFORMS
2002
REPRESENT WORDS IN TRAINING TEXT BY FENEMIC BASEFORMS
2004
IDENTIFY PHONETIC MODEL IN CONTEXT(s) $(T1_{ac})$
2006
ALIGN TRAINING TEXT FENEMIC BASEFORMS AGAINST PHONETIC BASEFORMS
2008
ASSOCIATE STRING OF FENEMIC MODELS WITH ALIGNED $T1_{ac}$
2010
STORE ASSOCIATED STRING FOR EACH TRAINING $T1_{ac}$
2012
FOR NEW WORD SEQUENCE OF PHONETIC MODELS, CORRELATE $T1_{ac}$ IN NEW WORD WITH A $T1_{ac}$
2014
REPRESENT EACH $T1_{ac}$ BY FENEMIC STRING ASSOCIATED WITH $T1_{ac}$
2016
CONCATENATE FENEMIC STRINGS FOR SUCCESSIVE $T1_{ac}$'s
2018

1. A method of synthesizing word baseforms for words wherein each synthesized baseform represents a series of models from a first set of models, each model of the first set corresponding to an output-related model wherein each output-related model correlates to an output generable by an acoustic processor, the method comprising the steps of:

(a) forming words as respective sequences of models from a second set of models, each model of the second set corresponding to a phonetic model;

(b) for a second set model occurring in a given context of second set models in step (a), storing a respective string of first set models;

(c) performing step (b) for each of at least one second set model; and

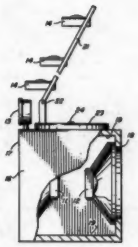
(d) constructing a word baseform of first set models for a word formed in step (a), including the step of representing each piece of a word that corresponds to a second set model in a given context by the stored respective string of first set models, if any, corresponding thereto.

4,882,760

SOUND REPRODUCTION SYSTEM

Raymond M. Yee, 1716 Grand Ave., Phoenix, Ariz. 85007

Continuation of Ser. No. 557,531, Dec. 2, 1983, abandoned. This application May 26, 1987, Ser. No. 54,047
Int. Cl.[4] H04R *1/02, 1/24*
U.S. Cl. 381—90 **22 Claims**



1. A sound reproduction system comprising:

(a) a closed walled cabinet having a base, a top and wall means including front and rear wall portions extending between said base and top, said front and rear wall portions facing in opposite directions, respectively, each of said front and rear wall portions having an opening therein;

(b) two high compliance, low frequency range speakers adjacent said openings in said front and rear wall portions, respectively, and having a concave surface at the front of the speaker and a convex surface at the rear of the speaker, the front of one of said low frequency range speakers facing said opening in said front wall portion and the front of the other of said low frequency range speakers facing said opening in said rear wall portion such that the front concave surfaces of said low frequency range speakers face in opposite directions;

(c) electrical driving means;

(d) circuit means connecting said driving means to said two low frequency range speakers, said driving means being adapted to cause said two low frequency range speakers to operate in a push-pull manner with outwardly urged excursion of said concave surface of one of said low frequency range speakers occurring with the simultaneous inwardly urged excursion of said concave surface of the other of said low frequency range speakers;

(e) said base being adapted to support said cabinet such that the projection axis of each of said two speakers is oriented in a substantially horizontal direction, and each of said two speakers being adapted to be directly coupled to an air propagating medium surrounding said cabinet without any intervening sound modifying means between each of said speakers and said air propagating medium whereby said two low frequency range speakers are caused to generate a sound field which radiates as an aura around the exterior of said cabinet with the sound perceived to be coming from the space surrounding said cabinet rather than from said speakers; and

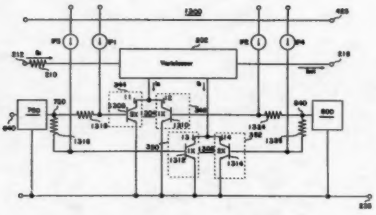
(f) a plurality of high-frequency range speakers and means mounted on said closed walled cabinet for supporting said plurality of high-frequency range speakers in a stacked array, spaced from each other and in nonaxial alignment above said closed walled cabinet with each of said high-frequency range speakers arranged to direct sound upwardly, substantially orthogonally to the directions of radiation of said two low-frequency range speakers mounted within said closed walled cabinet.

4,882,761

LOW VOLTAGE PROGRAMMABLE COMPRESSOR

Fred D. Waldhauer, La Honda, Calif., assignor to Resound Corporation, Redwood City, Calif.

Filed Feb. 23, 1988, Ser. No. 159,949
Int. Cl.[4] H04R *29/00, 1/64*
U.S. Cl. 381—106 13 Claims



1. An improved low voltage compressor or expander adapted for implementation on an integrated circuit comprising:

(a) input means for inputting an audio signal;

(b) output means for outputting a processed audio signal;

(c) variolosser means having first and second control terminals, an input terminal coupled to said inputting means and an output terminal coupled to said outputting means, said variolosser further including means for generating said processed audio signal in a predetermined gain relationship with respect to said audio signal wherein the gain relationship of said audio signal and said processed audio signal is controlled by the ratio of the currents flowing in said first and second control terminals; and

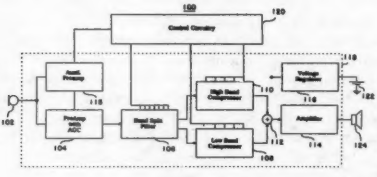
(d) control circuit means coupled to said variolosser means for independently controlling the current flowing in each of said first and second control terminals of said variolosser means wherein the ratio of said currents is controlled based on a predetermined relationship between said audio signal and said current flowing in each of said first and second control terminals.

4,882,762

MULTI-BAND PROGRAMMABLE COMPRESSION SYSTEM

Fred D. Waldhauer, La Honda, Calif., assignor to Resound Corporation, Redwood City, Calif.

Filed Feb. 23, 1988, Ser. No. 160,023
Int. Cl.[4] H04R *29/00;* H04B *1/64*
U.S. Cl. 381—106 14 Claims



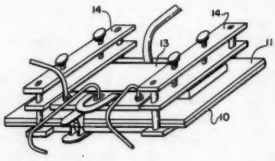
1. A multi-band compression system comprising means for receiving an audio signal, band split filter means coupled to said receiving means for separating said received audio signal into a plurality of frequency bands, a plurality of compressor means, each of said compressor means being coupled to said band split filter means for compressing a respective one of said frequency bands, summing means coupled to the output of each of said compressor means for combining said respective compressed frequency bands and generating a composite audio signal, means responsive to a first set of control signals for setting the compression ratio of each of said compressor means to a preselected separate value, and means responsive to a second set of control signals for setting the average gain of each of said compressor means to a preselected level independently of the others of said compressor means, wherein said means responsive to said first and second control signals provides frequency response equalization of said composite audio signal.

4,882,763

METHOD OF MAKING A ROCK-PORE MICROMODEL INVOLVING GENERATION OF AN ACCURATE AND RELIABLE TEMPLATE IMAGE OF AN ACTUAL RESERVOIR ROCK PORE SYSTEM

Stuart H. Buchan, Mill Valley, Calif.; Robert Ehrlich, Columbia, S.C.; Joyce C. Trygstad, Walnut Creek, Calif., and Norman C. Wardlaw, Calgary, Canada, assignors to The Standard Oil Company, Cleveland, Ohio

Continuation of Ser. No. 688,034, Dec. 31, 1984, abandoned.
This application Apr. 14, 1987, Ser. No. 38,295
Int. Cl.[4] G06K *9/00*
U.S. Cl. 382—1 13 Claims



1. A method of making a micromodel of a rock pore system comprising:

transmitting light through a thin section of a rock containing a pore system, said thin section having a dyes material disposed in said pore system to enhance the visibility of the pore system;

projecting the transmitted light onto a surface to form a two-dimensional image of the pore system including representations of the three-dimensional pore connectedness and geometry within said section;

digitizing the projected two-dimensional image to produce a two-dimensional binary template image of the pore system; and

etching said binary template imge into a substrate, whereby a micromodel of said pore system including its three-dimensional aspects is produced.

4,882,764

CUTOFF CONTROL SYSTEM

Bruce A. Reynolds, Sussex, and Alexander Brengauz, Whitefish Bay, both of Wis., assignors to Quad/Tech, Inc., Pewaukee, Wis.

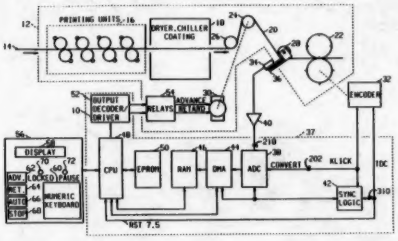
Division of Ser. No. 717,751, Mar. 29, 1985, Pat. No. 4,736,446.
This application Jan. 21, 1988, Ser. No. 146,619
The portion of the term of this patent subsequent to Apr. 5, 2005, has been disclaimed.
Int. Cl.[4] G06K *9/00*
U.S. Cl. 382—8 20 Claims

1. A system for relating a cyclical machine operation to the position of images on a web moving along a web path, by generating control signals to adjustment means for varying said machine operation relative to said moving web in accordance with said control signals, said system comprising:

means for generating, for successive machine operation cycles, indicia of variations in density of the image at respective sampling intervals related to the machine operation cycle throughout a substantial portion of said image;

means for selectively generating, from a first image indicia associated with a first machine operation cycle, reference pattern indicia;

means for selectively generating, from a successive image indicia associated with a successive machine operation cycle, successive pattern indicia; and



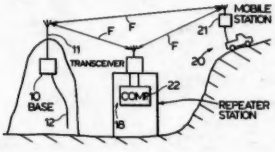
means for generating said control signals to said adjustment means to vary said machine operation relative to said moving web in accordance with differences between said reference pattern indicia and said successive pattern indicia.

4,882,765

DATA TRANSMISSION SYSTEM

Ray F. Maxwell, 7021 Parkview Place, Delta, British Columbia, Canada (V4E 2N3), and Robert D. White, 72054 88th Avenue, Surrey, British Columbia, Canada (V3W 3J2)

Filed May 22, 1987, Ser. No. 52,880
Int. Cl.[4] H04B *7/14*
U.S. Cl. 455—18 **15 Claims**



1. A data transmission system, comprising:

a base station;

at least one mobile station and a repeater station, each of said stations operating to transmit and to receive;

computer means associated with said repeater station,

said computer means determining, based on contents of a message transmitted by a transmitting station which is one of said base and mobile stations and received by said repeater station, how many times said message had been transmitted by said transmitting station; and

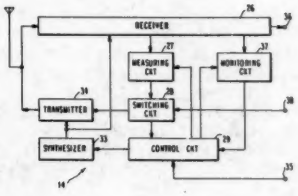
trigger means for causing said repeater station to retransmit said message solely when said computer means determines that said message has been retransmitted a preset number of times by said transmitting station.

4,882,766

TERMINAL STATION OF A RADIO COMMUNICATION NETWORK CAPABLE OF EFFECTIVELY USING RADIO CHANNELS ASSIGNED TO THE NETWORK

Yoshihiko Akaiwa, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Aug. 25, 1987, Ser. No. 89,102
Claims priority, application Japan, Aug. 25, 1986, 61-198706
Int. Cl.[4] H04B *7/00*
U.S. Cl. 455—58 **7 Claims**



1. A terminal station of a radio communication network for use in a common service area of a plurality of radio base stations comprising a main base station and a supplementary base station having a lower priority for said terminal station than said main base station, each base station being preassigned with a radio channel and for transmitting a channel status signal representative of whether said radio channel is idle or busy, wherein the improvement comprises:

first monitoring means for monitoring the channel status signal of said main base station to produce an internal signal when the radio channel of said main base station is idle;

second monitoring means for monitoring the channel status signal of said supplementary base station; and

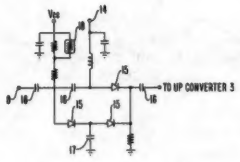
inhibiting means coupled to said first and said second monitoring means and responsive to said internal signal for inhibiting operation of said second monitoring means while the radio channel of said main base station is idle.

4,882,767

STABILIZED TRANSMITTER

Takashi Machida, Osaka; Kou Miyake, Takatsuki; Hirotaka Fujisaki, Neyagawa, and Hiroshi Mouri, Ibaraki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 18, 1988, Ser. No. 220,670
Int. Cl.[4] H01Q *11/12*
U.S. Cl. 455—117 **5 Claims**



1. A stabilized transmitter comprising;

a gain conversion means for passing an input signal and for varying its gain according to an electrical signal supplied thereto;

a power amplifier coupled to said gain conversion means for amplifying the power of an output signal from said gain conversion means; and

a compensation means having temperature detecting means that detects a temperature of said power amplifier for

generating from an electrical signal outputted from said temperature detecting means said electrical signal supplied to said gain conversion means so as to thereby compensate for gain variations of said power amplifier with respect to temperature variations so that a total transmission gain of said transmitter is maintained at a constant value;

wherein said compensation means has an adjusting means for adjusting in advance said electrical signal supplied to said gain conversion means so that said total transmission gain of said transmitter at a reference temperature becomes a predetermined value.

4,882,768

FM COMMUNICATION DEVICE WITH AVOIDANCE OF INTERFERENCE BY SUBSTANTIALLY SAME CHANNEL FM SIGNAL

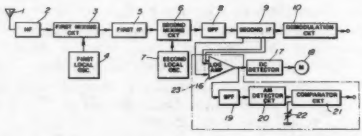
Bunichi Obana, and Kenichi Kanazawa, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 11, 1988, Ser. No. 167,138

Claims priority, application Japan, Mar. 18, 1987, 62-63587

Int. Cl.[4] H04B 1/16

U.S. Cl. 455—207 **8 Claims**



1. An FM communication device comprising:

an FM receiver circuit including an intermediate frequency amplifier;

a logarithmic amplifier connected to said intermediate frequency amplifier to receive outputs from various amplifier stages thereof, said logarithmic amplifier logarithmically amplifying an output of said intermediate frequency amplifier; and

means in communication with said logarithmic amplifier for detecting a ripple component contained in the output of said logarithmic amplifier, which ripple component is generated when a received FM signal is obstructed by another FM signal, to detect a signal obstruction, said detecting means further comprising a band pass filter interposed between said logarithmic amplifier and an AM detection circuit; and

means, responsive to said detecting means detecting said obstruction, for switching the communication channel for avoiding interference.

4,882,769

AM/FM RADIO WITH SUNGLASS HOUSING

Bruce A. Gallimore, 526 Marborough, Detroit, Mich. 48215

Filed Jul. 5, 1988, Ser. No. 214,936

Int. Cl.[4] H04B 1/08

U.S. Cl. 455—344 **4 Claims**

1. In combination, a housing in the form of sunglasses including a pair of rearwardly extending pivoted temples, the housing including a hollow top frame and a bottom frame;

an AM/FM radio with its electrical components mounted and enclosed within said top frame and including an output lead;

a pair of spaced jacks adjacent the ends of said housing and connected to said lead respectively;

right and left electric speakers slidably mounted upon said temples respectively, adapted for registry with the user's ears;

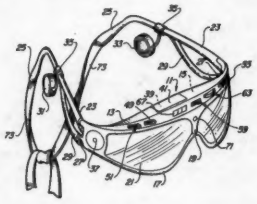
a flexible electrical lead interconnecting each speaker with one of said jacks;

said top frame including a battery compartment for storing an electrical power source connected to said radio;

a removable panel forming a part of said top frame normally closing said compartment;

an ON/OFF switch connected to said radio and having a movable control slidably projected through a slot in said top frame for manual access thereto;

an AM/FM switch connected to said radio and including a slidable selector projecting through a slot in said top frame;



an electrical tuner including a variable capacitor connected to said radio and having a rotative control projected through a slot in said top frame;

an stereo control switch connected to said radio output lead and including a movable control arm extending through a slot in said top frame;

a volume control switch including a variable potentiometer connected to said radio output lead and including a control arm projected through a slot in said top frame;

all of said slots being in longitudinal alignment along the length and upon the front of said top frame.

4,882,770

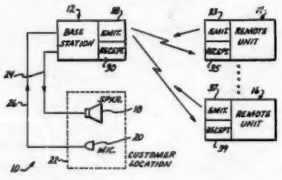
WIRELESS OPTICAL COMMUNICATION SYSTEM

Ronald T. Miyahira, Honolulu, Hi., and Kenneth Fasen, San Diego, Calif., assignors to H. M. Electronics, Inc., San Diego, Calif.

Filed Dec. 14, 1987, Ser. No. 132,345

Int. Cl.[4] H04B 9/00

U.S. Cl. 455—603 **30 Claims**



1. A wireless optical short range communication system utilizing a single optical carrier frequency comprising:

a base station;

a plurality of substantially similar spaced-apart remote units interconnected in optical communication with said base station;

each one of said remote units including an optical emitter for transmitting an optical message-carrying beam at a predetermined optical carrier frequency to said base station;

each one of said remote units further including an optical receptor for receiving an optical message-carrying beam from said base station;

said base station including an optical receptor for receiving the optical message-carrying beam transmitted by the optical emitter of any of said remote units;

said base station further including an optical emitter for repeating the message content of said optical message-car-

rying beam received from any one of said remote units to all of said remote units at said predetermined optical carrier frequency;

clock means for generating recurring time slot signals, said signals including inbound signals and outbound signals; and

said base station and said remote units including means responsive to said inbound and outbound signals for causing said station and said units to send and receive said beams during individual time slot signals.

4,882,771

SINGLE LASER OPTICAL COMMUNICATION SYSTEM AND METHOD

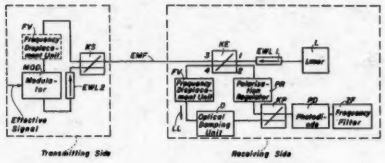
Manfred Rocks, Berlin, Fed. Rep. of Germany, assignor to Krone Aktiengesellschaft, Berlin, Fed. Rep. of Germany

Filed Apr. 21, 1988, Ser. No. 184,290

Claims priority, application Fed. Rep. of Germany, Apr. 21, 1987, 3713340

Int. Cl.[4] H04B 9/00

U.S. Cl. 455—605 17 Claims



10. A system for optical communication of information between a transmitting side and a receiving side spatially separated from each other comprising: a single laser for producing a non-modulated optical carrier arranged on the receiving side; at least one fiber-optical coupler for subdividing the non-modulated optical carrier of the single laser into a first optical carrier portion and a second optical carrier portion; a single-mode fiber transmission path connected to said fiber-optical coupler for receiving said first optical carrier portion, said second optical carrier portion forming a local laser wave at said receiving side; means for directing the first optical carrier portion through the single-mode fiber in the direction of the transmitting side; means for displacing in frequency one of the first optical carrier portion and the second optical carrier portion by an amount Δf; means for modulating the first optical carrier portion, said means for modulating being located on the transmitting side, said means for modulating receiving an effective signal providing information to form a modulated optical signal, said modulated optical signal being directed to the receiving side over said single-mode fiber means; mixing means for combining the modulated optical signal together with the local laser wave to form a combined optical signal; and, a photodiode for receiving the combined optical signal and a filter for converting the combined optical signal to a frequency band with a center frequency of Δf.

4,882,772

ELECTRO-OPTICAL LIGHT BEAM SIGNAL TRANSMISSION SYSTEM

Bruno A. Rist, Woodland Hills, and Alberto L. Casanova, Van Nuys, both of Calif., assignors to Telescript Industries, Inc., Van Nuys, Calif.

Continuation-in-part of Ser. No. 76,830, Jul. 23, 1987, abandoned. This application Jul. 30, 1987, Ser. No. 79,856

Int. Cl.[4] H04B 9/00

U.S. Cl. 455—617 21 Claims

1. A coherent light beam transmission system comprising;

coherent light generating means;

modulating means for modulating said coherent light generating means over a wide bandwidth;

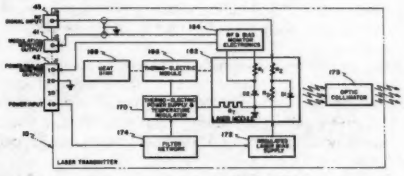
radiating means for radiating said modulated coherent light generated in a selected direction;

said radiating means including means for distributing said coherent light into a collimated beam having a safe energy level distribution;

a focussing lens mounted in the path of coherent light radiating from said coherent light generating means for focussing said coherent light on said radiating means;

means for preventing condensation of moisture on said focussing lens;

said means for preventing condensation of moisture on said focussing lens comprising a cap having a central aperture said focussing lens being mounted in said central aperture,



mounting means mounting said cap over said coherent light generating means, said cap enclosing a small volume of air between said coherent light generating means and said focussing lens; and heat sink means acting as a heat sink and warming means to warm said small volume of air to keep the focussing lens at at temperature greater than the outside air so that condensation of moisture on said focussing lens is prevented;

coherent light receiving means in alignment with signal coherent light radiating means;

decollimating means in said receiving means for decollimating said collimated beam, said decollimated means including means for focussing said coherent beam on light sensing means; and

distribution means connected to said light sensing means for distributing the communications signal received.

4,882,773

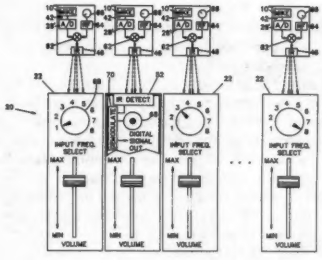
AUDIO MICROPHONE SYSTEM WITH DIGITAL OUTPUT AND VOLUME CONTROL FEEDBACK INPUT

Michael O. Maloney, Los Angeles, Calif., assignor to Donald A. Streck, Ventura, Calif., a part interest

Filed May 5, 1988, Ser. No. 190,346

Int. Cl.[4] H04B 9/00

U.S. Cl. 455—617 9 Claims



1. A microphone/pickup device providing a digital output therefrom comprising:

(a) microphone element means for sensing sound vibrations

and for producing an analog electrical signal reflecting said sound vibrations at an output thereof;

(b) analog to digital converter means having an input connected to receive said analog electrical signal directly from said microphone element for producing a digital signal reflecting said sound vibrations at an output thereof, said output of said analog to digital converter means being the output of the microphone/pickup device;

(c) mixer means disposed in combination with said analog to digital converter means for producing an output therefrom comprising the combination of signals input to a pair of inputs thereof, said output of said analog to digital converter means being connected to one of said pair of inputs of said mixer means;

(d) radio frequency generator means having an output disposed in combination with said analog to digital converter means for generating an RF signal at said output thereof, said output of said radio frequency generator means being connected to the other of said pair of inputs of said mixer means;

(e) light emitting diode means disposed in combination with said analog to digital converter means and operably connected to be activated by said output of said mixer means whereby said light emitting diode means emits a beam of light modulated with said digital signal and an RF carrier; and,

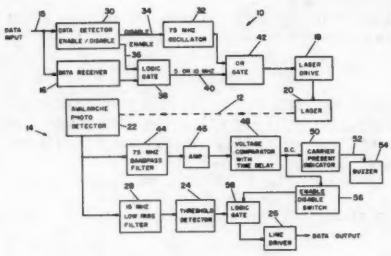
(f) means disposed in combination with said analog to digital converter means connected for selectably adjusting the frequency of said output of said radio frequency generator means.

4,882,774

LASER BEAM DATA VERIFICATION SYSTEM

Timothy L. Grotzinger, Palmyra, Pa., assignor to Laser Communications, Inc., Lancaster, Pa.

Filed Aug. 25, 1988, Ser. No. 236,150
Int. Cl.[4] H04B 9/00
U.S. Cl. 455—617 **7 Claims**



1. An apparatus for verification of the presence of a laser beam in a laser communications link comprising:

an alternate signal generator;

a signal substitution means connected to the alternate signal generator and to a laser beam transmitter sending out a laser beam to cause the transmitter to transmit an alternate signal generated by the alternate signal generator when no other signal is available at the transmitter input for transmission by the laser beam transmitter;

a receiver receiving the laser beam and including a photodetector which converts the laser beam impinging upon it to a related electrical signal;

a signal filter means connected to the photodetector and passing through signals of the frequency of the alternate signal, but blocking other signal frequencies; and

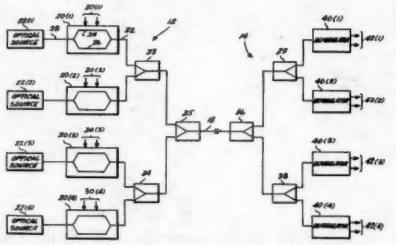
a signal control means connected to the signal filter means, preventing any signal from being sent out from the receiver except for a specific time period after the last alternate signal which has been received.

4,882,775

DEMODULATION TECHNIQUE FOR COHERENCE MULTIPLEXED OPTICAL DATA TRANSMISSION SYSTEM

Jeffrey O. Coleman, Medina, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jul. 22, 1988, Ser. No. 222,960
Int. Cl.[4] H04B 9/00
U.S. Cl. 455—617 **15 Claims**



1. An improved demodulator for use in an optical data transmission system, the system including a modulator associated with the demodulator, the modulator including means for receiving an optical carrier signal having a coherence length, interferometer means including modulated and reference arms each having input and output ends, means for coupling the optical carrier signal into the input ends of the arms and means for coupling radiation from the output ends of the arms into an optical bus, means for modulating the optical path length of the modulated arm based upon an electrical modulation signal representing an input data channel such that for each of a plurality of modulation signal values, the modulator and reference arms have a modulator optical path length difference that exceeds the coherence length of the optical carrier signal, the demodulator comprising:

an interferometer having first and second arms each having first and second ends, and means for coupling radiation from the optical bus into the first ends of the first and second arms, the first and second arms having a demodulator optical path length difference selected such that for each of said modulation signal values, the difference between the modulator and demodulator optical path length differences is less than the coherence length of the optical carrier signal; and

signal processing means connected to receive optical first and second arm output signals emerging from the second ends of the first and second arms respectively, and the signal processing means including means for processing the arm output signals in combination so as to produce a pair of electrical output signals such that linearly independent pairs of electrical output signals are produced for any two modulation signals that do not produce modulator optical path length differences that differ from one another by an integral multiple of a half wavelength of the optical carrier.

4,882,776

IMAGE INFORMATION TRANSMITTING SYSTEM

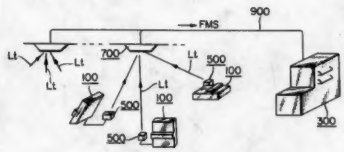
Shunichi Uzawa, Naka; Tetsuzo Mori, Kawasaki, and Noboru Koumura, Narashino, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 429,147, Sep. 30, 1982, abandoned. This application Feb. 24, 1986, Ser. No. 834,136

Claims priority, application Japan, Oct. 8, 1981, 56-159386; Oct. 9, 1981, 56-160155; Oct. 9, 1981, 56-160156; Oct. 9, 1981, 56-160157; Oct. 9, 1981, 56-160159; Oct. 9, 1981, 56-160160

Int. Cl.[4] H04B *9/00*

U.S. Cl. 455—617 19 Claims



1. An image transmission system comprising:

a plurality of image output means each for generating image data, wherein each of said plurality of image output means comprises setting means for setting one of a plurality of image forming modes and for generating mode data representing the set image forming mode, and converting means for converting the image data and the mode data into pulse-frequency modulated light signals and transmitting the light signals through space;

a commong receiving means for receiving the light signals transmitted from said plurality of image output means and for converting the light signals into pulse-frequency modulated electrical signals, wherein said common receiving means comprises correction means for correcting distortion of the pulse-frequency modulated electrical signals, wherein said correction means corrects the distortion of the electrical signals on a time basis; and

a single image forming means for forming an image on a recording medium in accordance with electrical image data contained in the electrical signals, wherein said single image forming means is operable in a plurality of image forming modes, and

wherein said common receiving means is operable to extract the image data and the mode data from the corrected electrical signals, and said single image forming means is arranged for image formation in a one of said image forming modes determined by the extracted mode data.

4,882,777

CATHETER

Onkar S. Narula, 5765 S.W. 117th St., Miami, Fla. 33156

Filed Apr. 17, 1987, Ser. No. 40,517

Int. Cl.[4] A61M *25/00*

U.S. Cl. 604—281 11 Claims

1. A device for engaging a desired internal position within a biological subject lateral and oblique relative to the entry point, comprising:

a catheter having a substantially straight portion, a distal end, a proximal end, a longitudinal axis extending from said distal end to said proximal end and a complex curvature extending longitudinally forward and laterally outward, said complex curvature extending from said distal end so that said curvature will automatically position said distal end of said catheter at said desired internal position.

4,882,778

ELECTRONIC LOAD DRIVE CONTROL APPARATUS

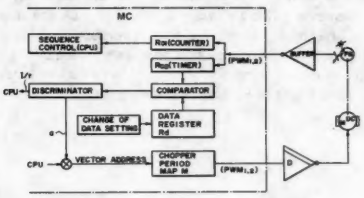
Masao Hosaka; Yoshitaka Ogino; Kazutoshi Shimada, all of Kanagawa, and Takashi Saito, Chiba, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 225,667, Jul. 29, 1988, abandoned, which is a continuation of Ser. No. 695,720, Jan. 28, 1985, abandoned. This application Feb. 27, 1989, Ser. No. 318,469

Claims priority, application Japan, Feb. 3, 1984, 59-19174

Int. Cl.[4] G06F *15/46;* G05B *19/403*

U.S. Cl. 364—187 11 Claims



1. An electric load drive control apparatus comprising:

an electric load;

drive means for driving said load;

control means for controlling said drive means by means of hardware;

a central processing unit for executing programs for controlling said control means and processing a task different from the control of said control means, said central processing unit providing control data for controlling said drive means to said control means before starting of control of said drive means by said control means; and

detecting means for detecting a drive condition of said load;

wherein said control means controls said drive means, independently of said central processing unit, in response to the operation of said detecting means so that the drive direction of said load is regulated in a desired manner corresponding to the control data, and

wherein said control means produce a signal for requesting said central processing unit to control said control means when said detecting means detects that the drive condition of said load departs from a control range corresponding to the control data, and controls said drive means on the basis of new control data transmitted from said central processing unit in response to the signal produced by said control means.

4,882,779

APPARATUS FOR COMMUNICATING WITH DATA SYSTEMS AND A METHOD OF COMMUNICATING WITH DATA SYSTEMS

Preben Rahtgen, V riose, Denmark, assignor to Pengeinstitutternes Kobe - og Kreditkortaktieselskab, Ballerup, Denmark

Continuation of Ser. No. 827,930, Jan. 16, 1986, abandoned. This application Oct. 11, 1988, Ser. No. 256,239

Claims priority, application Denmark, Apr. 12, 1984, 1907/84

Int. Cl.[4] H04L *9/02*

U.S. Cl. 380—24 12 Claims

3. A financial transaction terminal for use with a data carrying card, comprising:

card data input means for receiving data originating from said data carrying card and for receiving a card identification signal positively identifying said card as a card belonging to said first data system or, alternatively, as a card belonging to said second data system;

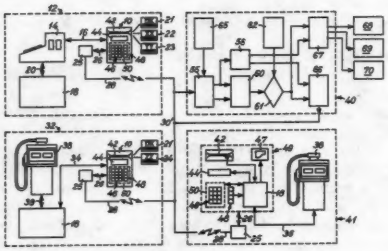
personal code input means for input of a personal authentication code;

first storage means for storing an encryption algorithm and a transmission protocol corresponding to said first data system;

first communication means for communication with a first data system;

encryption means, connected to said card data input means, said personal code input means, said first storage means and said first communication means, for encrypting said data and said code by employing said encryption algorithm stored in said first storage means, provided said card is positively identified as a card belonging to said first data system by employing said card identification signal, and for outputting said data and said code in encrypted form through said first communication means to said first data system controlled by said transmission protocol stored in said first storage means for on-line verification of said data relative to said code by said first data system;

second storage means for storing a verification algorithm corresponding to said second data system;



second communication means for communication with a second data system, said first and second data systems being mutually exclusive; and

comparator means, connected to said card data input means, said personal code input means, said second storage means and said second communication means, for comparing said data and said code by employing said verification algorithm stored in said second storage means, for off-line verification of the authenticity of a person in possession of said card relative to said second data system, provided said card is positively identified as a card belonging to said second data system by employing said card identification signal, and for outputting an authenticity code through said second communication means to said second data system in case said data are verified relative to said code by employing said verification algorithm stored in said second storage means or, alternatively, for outputting a non-authenticity code through said second communication means to said second data system in case said data are not verified relative to said code by employing said verification algorithm stored in said second storage means, such that said data and said code are not disclosed to said second data system.

4,882,780

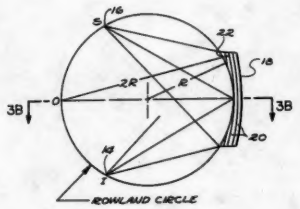
SCANNING MONOCHROMATOR CRYSTAL AND RELATED METHOD

David B. Wittry, Pasadena, Calif., assignor to University of Southern California, Los Angeles, Calif.

Division of Ser. No. 833,450, Feb. 26, 1986, Pat. No. 4,807,268, which is a continuation-in-part of Ser. No. 549,366, Nov. 4, 1983, Pat. No. 4,599,741. This application Jan. 3, 1989, Ser. No. 309,304

Int. Cl.[4] C21K *1/06*

U.S. Cl. 378—84 **10 Claims**



1. A crystal arrangement in combination with a scanning monochromator which has a point source and a mechanism for producing relative movement between the point source and the crystal arrangement to vary the angle at which radiation emanating from the point source impinges upon the crystal arrangement, the crystal arrangement comprising:

a crystal positioned with respect to a first reference plane containing the point source, the crystal having concave planes of lattice points and a concave crystal surface which satisfy Johannson geometric conditions within the first reference plane for a Rowland circle of radius R;

the planes of lattice points being substantially spherically curved with a radius of 2R within a second reference plane which is perpendicular to the first reference plane and bisects the Rowland circle; and

the crystal surface being substantially toroidally curved with a radius of substantially 2R within the second reference plane.

4,882,781

METHOD FOR PREDICTING STEADY-STATE CONDITIONS

Robert W. Allington, Lincoln, Nebr., assignor to Isco, Inc., Lincoln, Nebr.

Division of Ser. No. 300,567, Sep. 9, 1981, Pat. No. 4,422,942. This application Sep. 7, 1982, Ser. No. 415,276

Int. Cl.[4] G06F *15/46*; B01B *13/05*

U.S. Cl. 364—510 **11 Claims**

1. Apparatus for rapidly bringing a system from start-up to equilibrium comprising:

system means;

means for setting the rate of operation for said system means at a predetermined level;

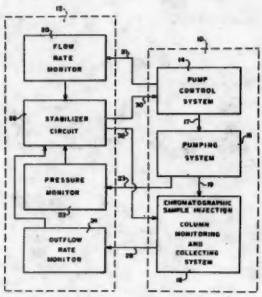
means for measuring, at a time of a low level of operation of said system means, a first characteristic of said system related to the rate of operation;

means for measuring the level of operation under the control of at least said measured first characteristic until the equilibrium value of operation is reached;

means for reducing said level of operation to said predetermined level;

said means for measuring a first characteristics including means for obtaining a second characteristic of the system that is inversely related to said first characteristic; and

means for setting up a proportion between the measured first characteristic and the range of said second characteristic, whereby any other value of the first characteristic may be calculated.



4,882,782

SAFETY APPARATUS FOR DETECTING AN ABNORMALITY OF POWER CONTROL ELEMENT

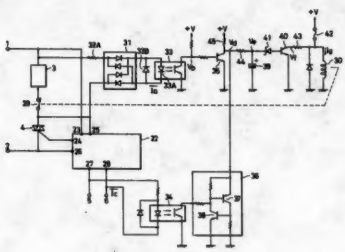
Junichi Kimizuka, Yokohama; Yukihide Ushio, Tokyo; Kaoru Seto, Chigasaki; Kenjiro Hori, Yokohama, and Toshihiko Inuyama, Fujisawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 690,941, Jan. 14, 1985, abandoned. This application Sep. 10, 1987, Ser. No. 96,806

Claims priority, application Japan, Jan. 23, 1984, 59-8504

Int. Cl.[4] H02H *3/00*

U.S. Cl. 361—100 **7 Claims**



1. A safety apparatus in a circuit for controlling an alternating current flowing in a load responsive to a control signal, said safety apparatus comprising:

a power control element for controlling a supply of the alternating current to the load;

control signal input means for inputting the control signal to control said power control element;

first detecting means for detecting an operating condition of said power control element, said operating condition being one of the group consisting of ON and OFF conditions;

second detecting means for detecting whether the control signal has been input to said control signal input means, wherein said second detecting means includes self-hold means for setting a self-holding condition if the control signal has been input and resetting said self-holding condition of said self-hold circuit in synchronization with the alternating current supplied to the load;

third detecting means for detecting an abnormality of said power control element if said first detecting means is detecting said ON condition and said self-holding condition of said second detecting means is reset;

fourth detecting means for detecting and forming an output if said third detecting means detects said abnormality over a time period of a half cycle of the alternating current; and

cutting means for cutting off the alternating current to the load in response to the output of said fourth detecting means, wherein said cutting means includes a fuse and a switch, said fuse being arranged to be blown in response to the output from said fourth detecting means, and said switch being arranged to cut the alternating current to the load in response to said fuse being blown.

4,882,783

PRE-RECORDED MAGNETIC VIDEO TAPE HAVING AN INFORMATION CODE ON THE SYNCHRONIZATION TRACK

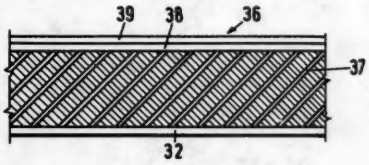
Peter Roggendorf, Mainz-Kostheim, Fed. Rep. of Germany, assignor to GSE Electronic Systems, Inc., Salt Lake City, Utah

Division of Ser. No. 3,932, Jan. 16, 1987, Pat. No. 4,703,311. This application Aug. 6, 1987, Ser. No. 82,790

Claims priority, application Fed. Rep. of Germany, Jun. 9, 1986, 3619359

Int. Cl.[4] G11B *27/10*

U.S. Cl. 360—134 **7 Claims**



1. A pre-recorded magnetic video tape having a synchronization track, said synchronization track comprising a plurality of first magnetic recordings each corresponding to a synchronization signal; and a plurality of second magnetic recordings each corresponding to a code signal, each of said second recordings at least partially overlapping a respective first recording, and at least one pair of overlapping recordings having a dimensional characteristic different from another pair of overlapping recordings so that such dimensional characteristic can represent different coded parameters.

4,882,784

LOSS-IN-WEIGHT FEEDER SYSTEM

Ronald S. Tump, Whitewater, Wis., assignor to Moksnes Manufacturing Co., Inc., Whitewater, Wis.

Filed Nov. 4, 1987, Ser. No. 117,077

Int. Cl.[4] G01G *11/08, 13/16;* G06F *15/20*

U.S. Cl. 364—567 **19 Claims**

1. A loss-in-weight feeder for discharging a flowable substance from a reservoir through a controllable discharge member under regulated conditions, comprising:

scale means for developing a weight signal representative of the weight of at least the material being discharged from said reservoir;

digital converting means in operative communication with said scale means for sampling said weight signal and developing digital weight signals representative thereof at a predetermined sampling rate;

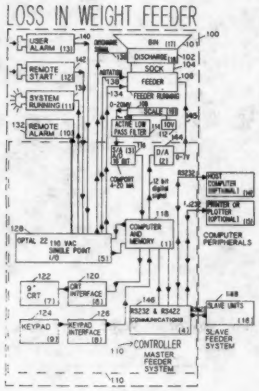
storage means in operative communication with said digital converting means for accumulating said digital weight signals;

computing means in operative communication with said digital converting means for developing arithmetic aver-

age weight signals from said digital weight signals representative of the actual feed rate from said reservoir;

input means, operatively associated with said storage means, for entering a signal representative of the desired feed rate from said reservoir into said storage means;

said computing means also being used for developing a correction signal based on a proportioned deviation signal determined as a time-weighted variable which is a function of any deviation between the actual feed rate and the desired feed rate; and



feedback means communicating with said computing means for applying said correction signal to said feeder to adjust the actual feed rate through said discharge member.

DESIGN PATENTS

GRANTED NOV. 21, 1989

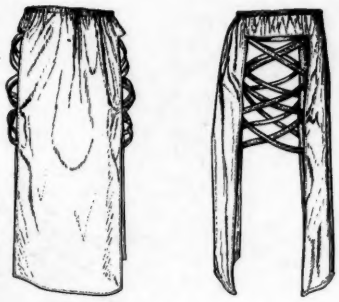
ERRATA

For CLASS	See PATENT NO.
D14-168	304,730

DESIGNS

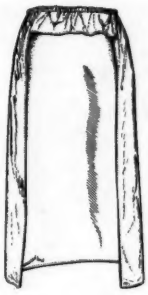
NOVEMBER 21, 1989

304,645
HALF-SLIP
Claire A. Rupert, 500 Park Ave., New York, N.Y. 10022
Filed Jul. 28, 1986, Ser. No. 889,870
Claims priority, application France, Dec. 19, 1985, 85 6083
Term of patent 14 years
U.S. Cl. D2—21

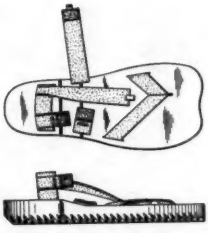


304,646
HALF-SLIP
Claire A. Rupert, 500 Park Ave., New York, N.Y. 10022
Filed Jul. 28, 1986, Ser. No. 889,967
Claims priority, application France, Dec. 19, 1985, 85 6083
Term of patent 14 years
U.S. Cl. D2—21

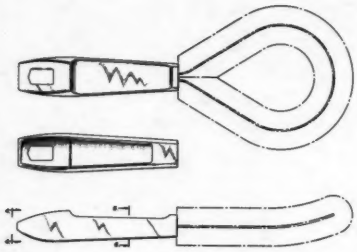
304,647
HALF-SLIP
Claire A. Rupert, 500 Park Ave., New York, N.Y. 10022
Filed Jul. 28, 1986, Ser. No. 889,871
Claims priority, application France, Dec. 19, 1985, 85 6083
Term of patent 14 years
U.S. Cl. D2—20



304,648
SWIMMING SANDAL
Pu G. Gwon, 5857 Arden, Highland, Calif. 92346
Filed Feb. 13, 1987, Ser. No. 14,676
Term of patent 14 years
U.S. Cl. D2—270

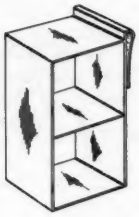


304,649
BRUSH HANDLE
Jolyon Saunders, Green Bay, New Zealand, assignor to Libman Broom Company, Arcola, Ill.
Filed Jun. 22, 1987, Ser. No. 64,447
Term of patent 14 years
U.S. Cl. D4—138

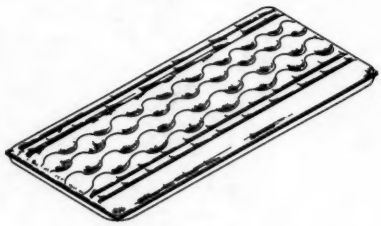


304,650
FOLDABLE POWER TOOL SUPPORT
T. David Price, 648 Turnin St., South St. Paul, Minn. 55075
Filed Mar. 13, 1987, Ser. No. 25,794
Term of patent 14 years
U.S. Cl. D6—429

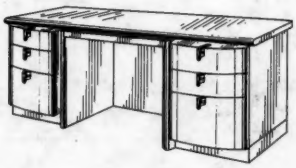
304,651
TOILET PAPER ROLL HOLDER FOR TOILET TANK ATTACHMENT
Loyle R. McKee, 11850 SW. Clifford St., Beaverton, Oreg. 97005
Filed Oct. 26, 1987, Ser. No. 112,436
Term of patent 14 years
U.S. Cl. D6—520

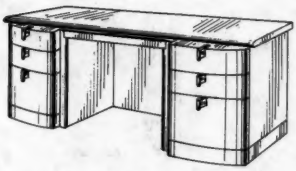


304,652
INFLATABLE MATTRESS
Eric Viesturs, 680-B Heritage Village, Southbury, Conn. 06488
Filed Jul. 27, 1988, Ser. No. 224,868
Term of patent 14 years
U.S. Cl. D6—604



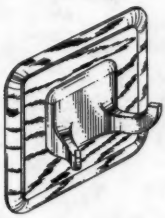
304,653
DESK
Norman J. Diekman, New York, N.Y., assignor to Stow & Davis Furniture Company, Grand Rapids, Mich.
Filed May 27, 1986, Ser. No. 867,876
Term of patent 14 years
U.S. Cl. D6—428



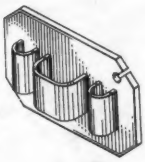


304,654
SEAT
John R. Stafford, Greensboro, N.C., assignor to Chromcraft Furniture Corp., Senatobia, Miss.
Filed Jun. 10, 1988, Ser. No. 205,240
The portion of the term of this patent subsequent to Oct. 10, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—502

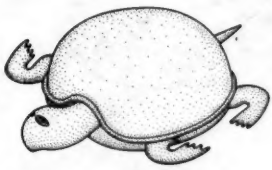
304,655
CLOTHES HOOK
Daniel L. Pool, Paradise Valley, Ariz., assignor to Designer Bathware, Inc., Phoenix, Ariz.
Division of Ser. No. 63,631, Jun. 17, 1987, Pat. No. D. 294,907, which is a division of Ser. No. 845,772, Mar. 24, 1986, Pat. No. 291,753, which is a division of Ser. No. 514,002, Jul. 17, 1983, Pat. No. 283,188. This application Dec. 28, 1987, Ser. No. 139,032
Term of patent 14 years
U.S. Cl. D6—323



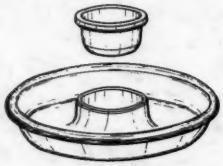
304,656
MULTI-PURPOSE HOLDER
D. Richard Hancock, R.F.D. Rte. #1, Box 383, Morgan, Utah 84050
Filed Apr. 14, 1987, Ser. No. 38,523
Term of patent 14 years
U.S. Cl. D6—553



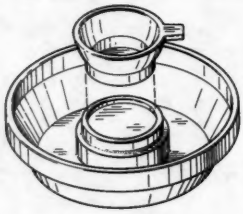
304,657
ADJUSTABLE PILLOW
Peggy Mason Hayes, 839-C Charles Allen Dr., NE., Atlanta, Ga. 30308
Filed Oct. 22, 1986, Ser. No. 922,130
Term of patent 14 years
U.S. Cl. D6—598



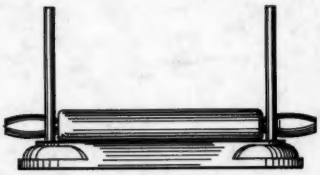
304,658
COMBINED TRAY AND BOWL
Maurizio Mattei, Macerata, Italy, assignor to Fratelli Guzzini S.p.A., Recanati, Italy
Filed Jan. 21, 1987, Ser. No. 5,877
Claims priority, application Italy, Jul. 29, 1986, 22671 B/86
Term of patent 14 years
U.S. Cl. D7—3

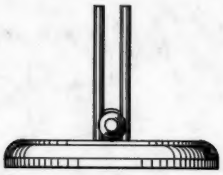


304,659
COMBINED CHIP AND SALSA SERVER
Jerome L. Asner, 2233 NW. 48th St., Oklahoma City, Okla. 73112
Filed May 4, 1987, Ser. No. 45,673
Term of patent 14 years
U.S. Cl. D7—3

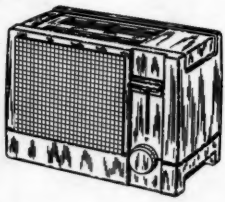


304,660
NAPKIN HOLDER
Lester C. Lynch, 8 River St., Cressona, Pa. 17929
Filed Oct. 26, 1987, Ser. No. 112,761
Term of patent 14 years
U.S. Cl. D7—72

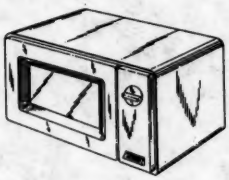


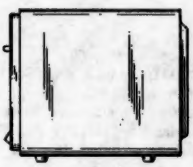


304,661
TOASTER
Jan F. Van Asten, Leek, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Continuation of Ser. No. 869,077, May 29, 1986, abandoned.
This application Jan. 17, 1989, Ser. No. 298,199
Claims priority, application Benelux, Dec. 6, 1985, 60628-02
Term of patent 14 years
U.S. Cl. D7—330

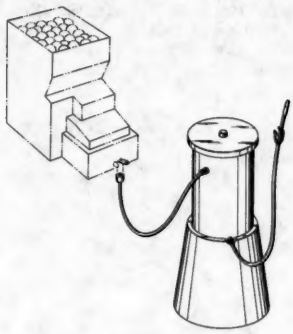


304,662
MICROWAVE OVEN
Seung H. Yoo, Buchon, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea
Filed Feb. 18, 1987, Ser. No. 16,178
Claims priority, application Rep. of Korea, Aug. 27, 1986, Des.86-12208
The portion of the term of this patent subsequent to Aug. 30, 2002, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—351

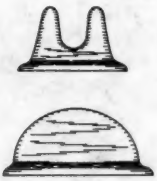




304,663
COMBINATION JUICE RESERVOIR AND DISPENSER
Robert F. Tunila, 22392 Rippling Brook, El Toro, Calif. 92647
Continuation-in-part of Ser. No. 551,952, Nov. 15, 1983, abandoned. This application Feb. 4, 1986, Ser. No. 825,858
Term of patent 14 years
U.S. Cl. D7—397



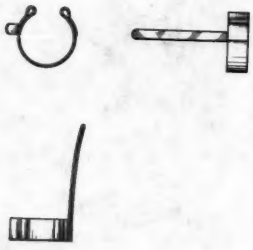
304,664
TACO HOLDER
Bryan C. Wyant, 2214 E. Fountain Blvd., Colorado Springs, Colo. 80910
Filed Jan. 30, 1987, Ser. No. 9,139
Term of patent 14 years
U.S. Cl. D7—76



304,665
ALE FONT
Michael J. Start, Poole, England, assignor to Homark Associates Limited, Dorset, England
Filed Dec. 5, 1986, Ser. No. 938,742
Claims priority, application United Kingdom, Jun. 11, 1986, 1034707
Term of patent 14 years
U.S. Cl. D7—313

304,666
SNOWSHOVEL
Barbara A. Rogers, 1049 Evans Ave., Reno, Nev. 89512
Filed Mar. 14, 1988, Ser. No. 167,445
Term of patent 14 years
U.S. Cl. D8—10

304,667
GRIPPING BAND FOR PLIERS
Robert A. Hutton, 10890 Galvin St., Ventura, Calif. 93004
Filed Jun. 19, 1986, Ser. No. 876,363
Term of patent 14 years
U.S. Cl. D8—18

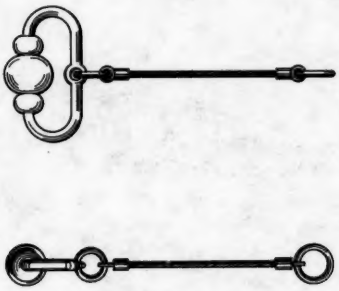


304,668
FORKED WRENCH
Bruce L. Strock, 3046 Camino Graciosa St., Thousand Oaks, Calif. 91360
Filed Mar. 10, 1987, Ser. No. 27,023
Term of patent 14 years
U.S. Cl. D8—17

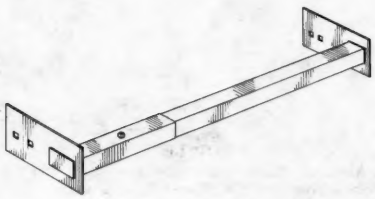
304,669
ADJUSTABLE WRENCH
William D. Boyd, 410 N. Vine St., Agency, Iowa 52530, and Bill E. Boyd, Rte. 4, Box 310, Ottumwa, Iowa 52501
Filed Mar. 13, 1987, Ser. No. 25,799
Term of patent 14 years
U.S. Cl. D8—22

304,670
PAINT STRAINER HOLDER
Paul E. Johnson, 1115 Main St., Springfield, Oreg. 97477
Filed Aug. 1, 1986, Ser. No. 891,589
Term of patent 14 years
U.S. Cl. D8—71

304,671
COMBINED GATE LATCH PULL AND CABLE
Robert W. Reaney, 5013 Stancliff St., Bakersfield, Calif. 93307
Filed Aug. 24, 1987, Ser. No. 88,899
Term of patent 14 years
U.S. Cl. D8—301



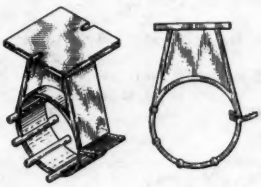
304,672
ADJUSTABLE SECURITY BAR
Stanley W. Pearson, 1601 Cambridge Dr., Kinston, N.C. 28501
Filed Mar. 31, 1987, Ser. No. 32,708
Term of patent 14 years
U.S. Cl. D8—331



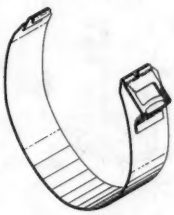
304,673
SCISSORS FOR HOLDING INTERCHANGEABLE BLADES
Anthony T. Rose, and Therezia M. Rose, both of 741 Lakefield Rd., Westlake Village, Calif. 91361
Filed Oct. 17, 1986, Ser. No. 919,812
Term of patent 14 years
U.S. Cl. D8—57

304,674
LUGGAGE LOCK
Urs Gisiger, Gaensbruehlweg 4, 2545 Zelzach, Switzerland
Filed Oct. 26, 1987, Ser. No. 113,723
Term of patent 14 years
U.S. Cl. D8—341

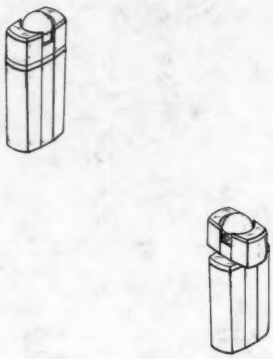
304,675
CEILING MOUNTABLE HOOK
Gordon E. Rogers, 600-217 E. Weddell, Sunnyvale, Calif. 94089
Filed Oct. 16, 1987, Ser. No. 108,978
Term of patent 14 years
U.S. Cl. D8—380



304,676
CLAMPING BAND FOR A GAS CYLINDER
Michael H. Glynn, Near Basingstoke, United Kingdom, assignor to Sabre Safety Limited, Aldershot, England
Filed Feb. 2, 1987, Ser. No. 10,111
Claims priority, application United Kingdom, Aug. 13, 1986, 1,036,064
Term of patent 14 years
U.S. Cl. D8—395

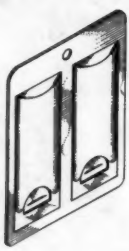


304,677
AEROSOL CONTAINER
Tomio Nitta, Yokohama, Japan, assignor to Tokai Corporation, Yokohama, Japan
Filed Nov. 3, 1986, Ser. No. 925,931
Claims priority, application Japan, May 9, 1986, 61-17092
Term of patent 14 years
U.S. Cl. D9—300

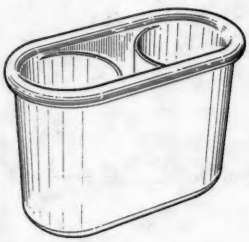


304,678
TRAY
Henry R. Vigue, Waterville, Me., assignor to Keyes Fibre, Waterville, Me.
Filed Jan. 9, 1987, Ser. No. 1,956
Term of patent 14 years
U.S. Cl. D9—341

304,679
DUAL DISPENSING PACKAGE WITH FINGER SLOTS
Arthur P. Corella, 8166 Vanscoy Ave., North Hollywood, Calif. 91602
Filed Feb. 2, 1987, Ser. No. 10,152
Term of patent 14 years
U.S. Cl. D9—341

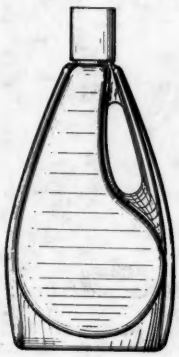


304,680
CONTAINER FOR BOTTLES
Arthur R. Carlson, 401A Waverley Road, East Malvern, Victoria, 3145, Australia
Filed Jun. 5, 1987, Ser. No. 58,533
Term of patent 14 years
U.S. Cl. D9—341

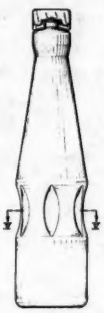


304,681
BOTTLE
Spyros Metaxa, Athens, Greece, assignor to S. & E. & A. Metaxa International S.A., Vaduz, Liechtenstein
Filed Jul. 21, 1986, Ser. No. 887,632
Claims priority, application Fed. Rep. of Germany, Jan. 21, 1986, URA 68/86
Term of patent 14 years
U.S. Cl. D9—352

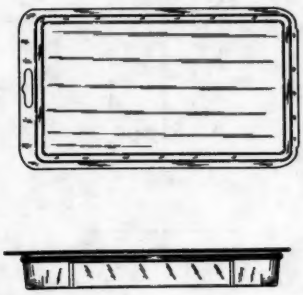
304,682
JUG
John Di Gianni, Pelham Manor, N.Y., assignor to Sunola Food Corporation, New Milford, Conn.
Filed Nov. 28, 1986, Ser. No. 937,525
Term of patent 14 years
U.S. Cl. D9—378



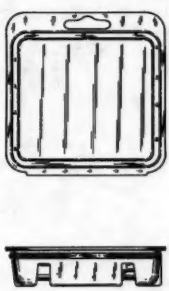
304,683
BOTTLE
Kurt Hofer, Kalbeckgasse 6, A-1180 Vienna, Austria
Filed Feb. 19, 1986, Ser. No. 834,068
Term of patent 14 years
U.S. Cl. D9—390



304,684
CONTAINER
Frederick B. Hadtke, New Providence, N.J., assignor to Champion Spark Plug Company, Toledo, Ohio
Filed Jul. 8, 1986, Ser. No. 883,481
The portion of the term of this patent subsequent to Nov. 21, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—415

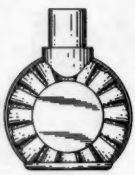


304,685
CONTAINER
Frederick B. Hadtke, New Providence, N.J., assignor to Champion Spark Plug Company, Toledo, Ohio
Filed Jul. 8, 1986, Ser. No. 883,482
The portion of the term of this patent subsequent to Nov. 21, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—415



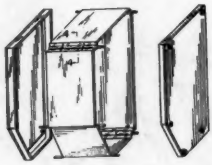
304,686
SOFT DRINK CONTAINER
Bud Jarrin, 259A Eastwoods Rd., Pound Ridge, N.Y. 10576
Filed Jul. 16, 1986, Ser. No. 886,113
Term of patent 14 years
U.S. Cl. D9—368

304,687
BOTTLE
James Miyakawa, 7 Asbury La., Aberdeen, N.J. 07747
Filed Sep. 30, 1986, Ser. No. 914,593
Term of patent 14 years
U.S. Cl. D9—403



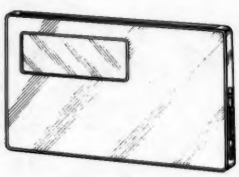
304,688
BOTTLE
James Miyakawa, Aberdeen, N.J., assignor to Guest Supply, Inc., New Brunswick, N.J.
Filed Sep. 30, 1986, Ser. No. 914,594
Term of patent 14 years
U.S. Cl. D9—403

304,689
COLLAPSIBLE CARGO CONTAINER
Gerald A. Dixon, 101 Candelite Cir., McMurray, Pa. 15317
Filed Nov. 21, 1986, Ser. No. 933,599
Term of patent 14 years
U.S. Cl. D9—424

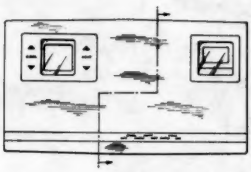


304,690
ELECTRONIC CLOCK
Klaus D. Zang, Bad Homburg, Fed. Rep. of Germany, assignor to Walter GmbH, Mettlach, Fed. Rep. of Germany
Filed Feb. 10, 1987, Ser. No. 12,706
Claims priority, application Fed. Rep. of Germany, Aug. 13, 1986, 3MR30
Term of patent 14 years
U.S. Cl. D10—15

304,691
PORTABLE CLOCK
Tatsuya Kubo, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan
Filed Jun. 5, 1986, Ser. No. 871,582
Term of patent 14 years
U.S. Cl. D10—15

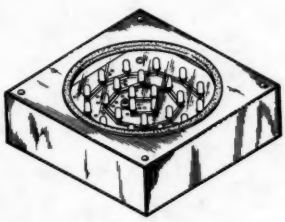


304,692
THERMOSTAT HOUSING OR THE LIKE
Jeffrey L. Parker, and Edward Parker, both of Jacksonville, Fla., assignors to Parker Electronics, Inc., Jacksonville, Fla.
Filed Feb. 12, 1987, Ser. No. 13,867
Term of patent 14 years
U.S. Cl. D10—60



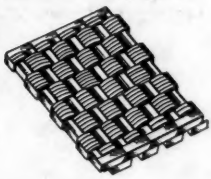
304,693
WEIGHING SCALE
Daniel Slater, 110 Heather Ct., Rolling Meadows, Ill. 60008
Filed Dec. 22, 1986, Ser. No. 944,610
Term of patent 14 years
U.S. Cl. D10—93

304,694
END-OF-TRAIN LED BEACON
Randall Goss, Fayetteville, assignor to American Railroad Technology, Inc., Fayetteville, Ark.
Filed Oct. 31, 1986, Ser. No. 925,671
Term of patent 14 years
U.S. Cl. D10—114



304,695
BRACELET
Paolo Bulgari, No. 11, Via dei Condotti, Rome 00187, Italy
Filed Dec. 14, 1987, Ser. No. 132,101
Claims priority, application Italy, Jun. 22, 1987, 35871-B/87
Term of patent 14 years
U.S. Cl. D11—15

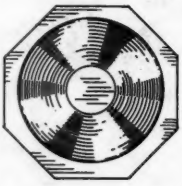
304,696
EXPANSION BRACELET
Murray L. Cowan, Norwood, Mass., assignor to Textron Inc., Del.
Filed Jul. 20, 1987, Ser. No. 77,403
Term of patent 14 years
U.S. Cl. D11—25



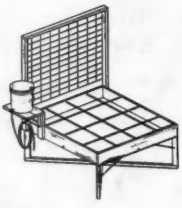
304,697
FLASHING EARING
Timothy R. Crews, 10920 Borcus Ave., Alliance, Ohio 44601-8704
Filed Nov. 6, 1987, Ser. No. 117,654
Term of patent 14 years
U.S. Cl. D11—56

304,698
GEMSTONE
Harold Johnston, 8039 - 43rd Ave., NE., Seattle, Wash. 98115
Filed Sep. 22, 1986, Ser. No. 910,173
Term of patent 14 years
U.S. Cl. D11—90

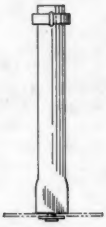
304,699
LAPEL BUTTON
Robert J. De brey, 4502 Browndale Ave., Edina, Minn. 55424
Filed Jul. 16, 1987, Ser. No. 74,015
Term of patent 14 years
U.S. Cl. D11—99



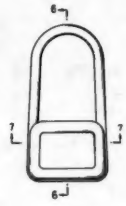
304,700
COMBINED PLANTER, TRELLIS AND IRRIGATION UNIT
Newell A. Holman, 382 Pearson, Ferndale, Mich. 48220
Filed Jul. 24, 1987, Ser. No. 77,332
Term of patent 14 years
U.S. Cl. D11—155



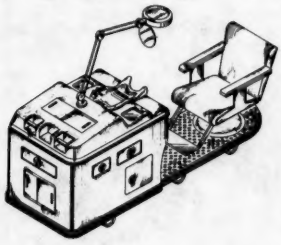
304,701
PLANT STAND
Ira Kleinberg, Great Neck, N.Y., assignor to Reliance Trading Corp. of America, Chicago, Ill.
Filed Apr. 23, 1987, Ser. No. 41,357
Term of patent 14 years
U.S. Cl. D11—146



304,702
PULL TAB OF SLIDER FOR SLIDE FASTENER
Sadaho Asahi, Uozu, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan
Filed Feb. 18, 1987, Ser. No. 15,967
Claims priority, application Japan, Mar. 11, 1986, D61-8674
Term of patent 14 years
U.S. Cl. D11—221



304,703
MOBILE SALON
Michael Phillips, P.O. Box 35393, Houston, Tex. 77235-5395
Filed Feb. 6, 1986, Ser. No. 826,724
Term of patent 14 years
U.S. Cl. D12—1



304,704
AUTOMOBILE TIRE
Tetsushi Fujiki, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Mar. 17, 1987, Ser. No. 26,644
Claims priority, application Japan, Dec. 9, 1986, 61.48717
Term of patent 14 years
U.S. Cl. D12—146

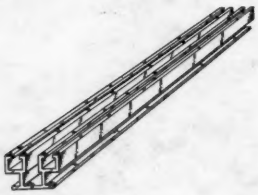
304,705
AUTOMOBILE TIRE
Akihito Monta, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Mar. 17, 1987, Ser. No. 26,651
Claims priority, application Japan, Dec. 9, 1986, 61-48712
Term of patent 14 years
U.S. Cl. D12—146

304,706
AUTOMOBILE TIRE
Akihiro Nakatani, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Feb. 26, 1987, Ser. No. 19,075
Claims priority, application Japan, Oct. 16, 1986, 61-41220
Term of patent 14 years
U.S. Cl. D12—147

304,707
AUTOMOBILE TIRE
Akihito Monta, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Mar. 17, 1987, Ser. No. 26,566
Claims priority, application Japan, Dec. 9, 1986, 61-48711
Term of patent 14 years
U.S. Cl. D12—149

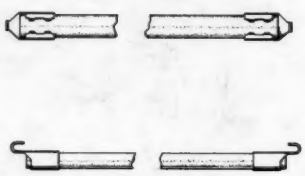
304,708
AUTOMOBILE TIRE
Tetsushi Fujiki, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Mar. 17, 1987, Ser. No. 26,645
Claims priority, application Japan, Dec. 9, 1986, 61-48718
Term of patent 14 years
U.S. Cl. D12—150

304,709
BACKING SUPPORT FOR WINDSCREEN WIPER BLADES
Marino R. Sussich, Altona North, Australia, assignor to Itemstay Limited, London, England
Filed Mar. 4, 1987, Ser. No. 21,422
Claims priority, application Australia, Sep. 24, 1986, 6839/86
Term of patent 14 years
U.S. Cl. D12—155

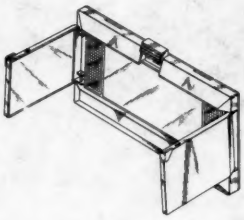


304,710
REAR VIEW MIRROR OR SIMILAR ARTICLE
Bernard C. Sharp, White Plains, N.Y., assignor to Parker Hannifin Corporation, Cleveland, Ohio
Filed Jun. 25, 1987, Ser. No. 66,871
Term of patent 14 years
U.S. Cl. D12—187

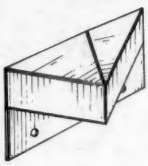
304,711
CLIP-ON AUTOMOBILE BODY SIDE MOLDING
Paul F. Clarke, 33 Hemlock Ct., Durham, Conn. 06422
Filed Jul. 31, 1987, Ser. No. 81,710
Term of patent 14 years
U.S. Cl. D12—190



304,712
LIGHTED VANITY MIRROR WITH HINGED DOORS FOR ATTACHMENT TO THE SUN VISOR OF AN AUTOMOBILE
Kwok K. Cheung, Kwai Chung, N.T., Hong Kong, assignor to Chi Kuan Manufactory Limited, Hong Kong
Filed Jan. 2, 1987, Ser. No. 579
Claims priority, application United Kingdom, Jul. 1, 1986, 1035080
Term of patent 14 years
U.S. Cl. D12—191



304,713
NOSE ORNAMENT FOR AN AUTOMOBILE
Ralph Perricelli, 313 Oradell Ave., Paramus, N.J. 07652
Filed Feb. 26, 1987, Ser. No. 19,328
Term of patent 14 years
U.S. Cl. D12—197



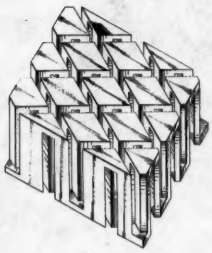
304,714
VIBRATION ISOLATOR FOR ELECTRIC MOTOR
Hiroshi Tanifuzi, Yokohama, and Tamotsu Nishimura, Kawasaki, both of Japan, assignors to Showa Electric Wire & Cable Co., Ltd., Japan
Filed Sep. 18, 1986, Ser. No. 908,637
Term of patent 14 years
U.S. Cl. D13—1

304,715

HEAT SINK OR SIMILAR ARTICLE

Joseph L. Horvath, Poughkeepsie, and Eric B. Hultmark, Wappingers Falls, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 16, 1987, Ser. No. 97,471
Term of patent 14 years
U.S. Cl. D13—23

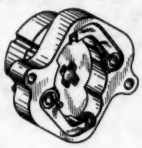


304,716

FLOURESCENT LAMP SOCKET

George E. Johnson, Bronxville, and Paul Endres, Glen Oaks, both of N.Y., assignors to Leviton Manufacturing Company, Inc., Little Neck, N.Y.

Filed Feb. 17, 1987, Ser. No. 15,768
Term of patent 14 years
U.S. Cl. D13—25

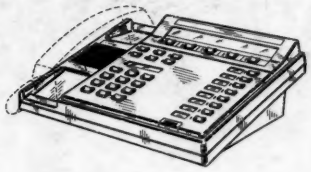


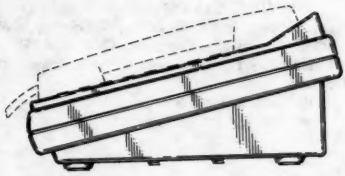
304,717

BASE HOUSING FOR A MULTI-FEATURE TELEPHONE CALL PROCESSOR

William C. Barker, Scottsdale; Pathukotta Desikan, Phoenix; Ross E. Fraser; Michael W. Pflueger, both of Glendale, and Kamal S. Sethia, Phoenix, all of Ariz., assignors to AG Communication Systems Corporation, Phoenix, Ariz.

Filed May 23, 1988, Ser. No. 197,798
Term of patent 14 years
U.S. Cl. D14—241



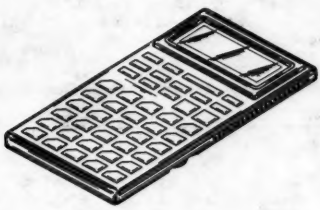


304,718

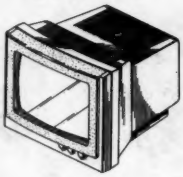
INPUT/OUTPUT DEVICE FOR ELECTRONIC MEMO

Hiroshi Sakaguchi, and Masaki Kawamura, both of Osaka, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

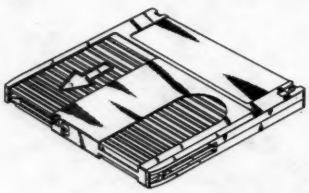
Filed Nov. 26, 1986, Ser. No. 935,538
Claims priority, application Japan, May 29, 1986, 61-20965
Term of patent 14 years
U.S. Cl. D14—100



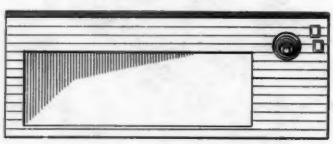
304,719
COMPUTER MONITOR OR SIMILAR ARTICLE
Chee-Chung Leung, Taipei, Taiwan, assignor to Cal-Comp Electronics Inc., Taipei, Taiwan
Filed Apr. 28, 1987, Ser. No. 43,413
Term of patent 14 years
U.S. Cl. D14—113



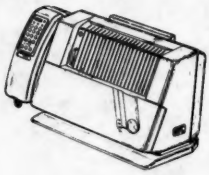
304,720
DISK CARTRIDGE
Philip R. Ashe, Hilton; James R. Carey, Rochester, both of N.Y.; Patrick J. Champagne, Cupertino, Calif., and David L. Rowden, Rochester, N.Y., assignors to Verbatim Corporation, Sunnyvale, Calif.
Filed Jun. 9, 1987, Ser. No. 60,581
Term of patent 14 years
U.S. Cl. D14—114



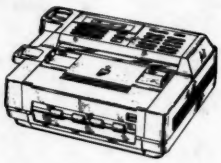
304,721
ENCLOSURE FOR A COMPUTER KEYBOARD WITH JOYSTICK
Peter J. Mikan, 31 Greenfield Rd., Milford, Conn. 06460
Filed Nov. 7, 1988, Ser. No. 267,773
Term of patent 14 years
U.S. Cl. D14—115



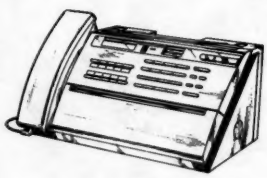
304,722
FACSIMILE TRANSCEIVER
Kazunori Hashimoto, Tachikawa; Yoshihiro Kawakatsu, Sayama; Tooru Ebihara, Ichikawa; Hideyasu Shimizu, Yokohama; Shinichiro Tsunematsu, Yokohama, and Hirokazu Takeda, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Mar. 4, 1987, Ser. No. 22,263
Claims priority, application Japan, Sep. 22, 1986, 61-37155
Term of patent 14 years
U.S. Cl. D14—118



304,723
FACSIMILE
Yoshiharu Tsutomu, Ayase, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jul. 8, 1987, Ser. No. 71,044
Claims priority, application Japan, Jan. 30, 1987, 62-3398
Term of patent 14 years
U.S. Cl. D14—117



304,724
FACSIMILE TRANSCEIVER
Kazunori Hashimoto, Tachikawa; Masahito Saegusa; Takashi Ohwada, both of Mitaka; Yoshihiro Kawakatsu, Sayama; Katsubumi Ohuchi, Chigasaki; Hiroshi Endo, Yokohama, and Kyoichi Yamashita, Fujisawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Sep. 28, 1987, Ser. No. 101,552
Claims priority, application Japan, Mar. 27, 1987, 62-11311
Term of patent 14 years
U.S. Cl. D14—118



304,725

PUBLIC PAY TELEPHONE STAND WITH ALTERNATIVE PAYMENT MEANS

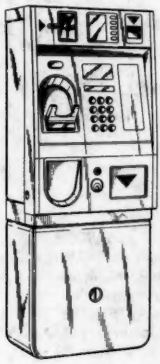
Martin S. Rose, Sudbury, England, assignor to GEC Plessy Telecommunications Ltd., Coventry, England

Filed Jun. 14, 1988, Ser. No. 210,105

Claims priority, application United Kingdom, Dec. 16, 1987, 1407136

Term of patent 14 years

U.S. Cl. D14—142



304,726

TELEPHONE DIALING APPARATUS

Richard R. Brooks, Greenwood, Ind., and John H. Schaffeld, Morristown, N.J., assignors to American Telephone and Telegraph Company, New York, N.Y. and AT&T Bell Laboratories, Murray Hill, N.J.

Filed Sep. 26, 1988, Ser. No. 249,461

Term of patent 14 years

U.S. Cl. D14—149

304,727

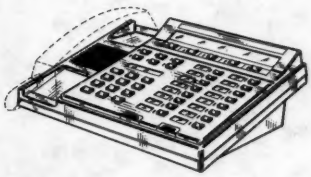
BASE HOUSING FOR A MULTI-FEATURE TELEPHONE CALL PROCESSOR

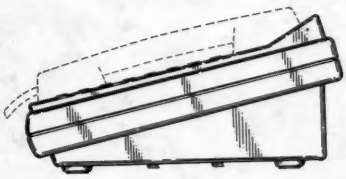
William C. Barker, Scottsdale; Pathukotta K. Desikan, Phoenix; Ross E. Fraser; Michael W. Pflueger, both of Glendale, and Kamal S. Sethia, Phoenix, all of Ariz., assignors to AG Communication Systems Corporation, Phoenix, Ariz.

Filed May 23, 1988, Ser. No. 197,799

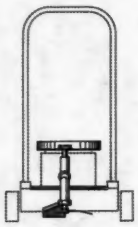
Term of patent 14 years

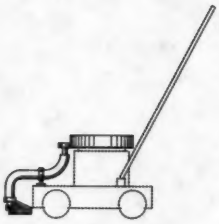
U.S. Cl. D14—241

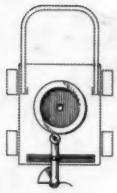




304,728
STRING TRIMMER ATTACHMENT FOR A LAWNMOWER
Peter V. Piorkowski, Box 402, Sorrento, Fla. 32776
Filed Nov. 30, 1987, Ser. No. 126,941
Term of patent 14 years
U.S. Cl. D15—16

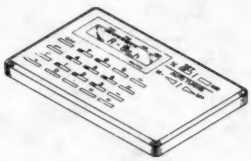




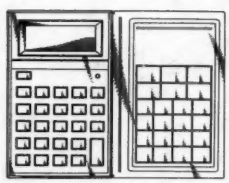


304,729
CAMERA
Yoshiaki Sugiyama, Zushi; Yoichi Tosaka, and Shosuke Haraguchi, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Apr. 8, 1987, Ser. No. 35,708
Claims priority, application Japan, Oct. 14, 1986, 61-40846
Term of patent 14 years
U.S. Cl. D16—217

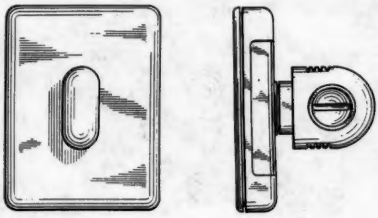
304,730
COMBINED RADIO RECEVIER AND CALCULATOR
Akihiro Miyahara, Kunitachi, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan
Filed Jun. 4, 1987, Ser. No. 58,023
Claims priority, application Japan, Apr. 8, 1987, 62-13774
Term of patent 14 years
U.S. Cl. D14—168



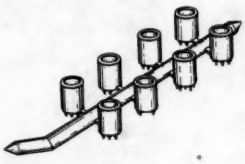
304,731
ELECTRONIC CALCULATOR
Yuichi Ohnumata, Kunitachi, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan
Filed Nov. 24, 1986, Ser. No. 934,320
Term of patent 14 years
U.S. Cl. D18—7



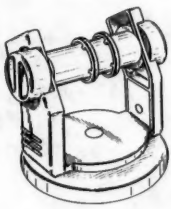
304,732
HAND STAMP
David M. Hines, 12452 Rosalind Dr., Orange, Calif. 92669
Filed Sep. 19, 1986, Ser. No. 909,452
Term of patent 14 years
U.S. Cl. D18—15



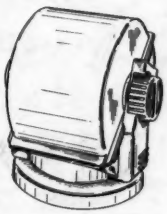
304,733
PLURAL-TOOL UNIT FOR USE BY AN ARTIST
Charles W. Lehman, 608 Hawkeye La., and Michael Sanders, 504 W. Wilson St., both of Kentland, Ind. 47951
Filed Oct. 8, 1986, Ser. No. 916,853
Term of patent 14 years
U.S. Cl. D19—36



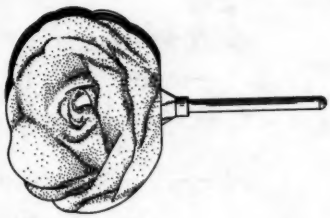
304,734
SWIVEL ROTARY FILE
John Leszczak, Roselle Park, N.J., and Robert B. Staubitz, Avon, Conn., assignors to Bates Manufacturing Company, Hackettstown, N.J.
Filed Jan. 21, 1987, Ser. No. 5,739
Term of patent 14 years
U.S. Cl. D19—76



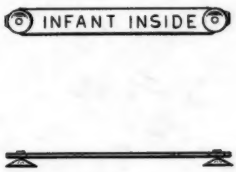
304,735
COVERED SWIVEL ROTARY FILE
John Leszczak, Roselle Park, N.J., and Robert B. Staubitz, Avon, Conn., assignors to Bates Manufacturing Company, Hackettstown, N.J.
Filed Jan. 21, 1987, Ser. No. 6,091
Term of patent 14 years
U.S. Cl. D19—76



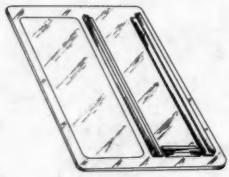
304,736
COMBINED WRITING PAD AND PEN
Daniel P. Leahan, 1420 S. Bayshore Dr., Apt. 402, Miami, Fla. 33131
Filed Aug. 21, 1986, Ser. No. 898,611
Term of patent 14 years
U.S. Cl. D19—78



304,737
SIGN FOR AN AUTOMOBILE WINDOW
Eugene Y. Mori, 5444 Via Campo, Los Angeles, Calif. 90022
Filed Apr. 17, 1987, Ser. No. 39,368
Term of patent 14 years
U.S. Cl. D20—42

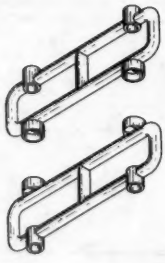


304,738
MESSAGE PANEL
Maxie L. Jones, Savannah, Tenn., assignor to Tennessee Valley Authority, Muscle Shoals, Ala.
Filed Jul. 20, 1987, Ser. No. 75,918
Term of patent 14 years
U.S. Cl. D20—42



304,739
SIMULATIVE TOY BOX
Hiroshi Ukisu, Matsudo, Japan, assignor to Epoch Company, Ltd., Tokyo, Japan
Filed May 20, 1988, Ser. No. 196,340
Term of patent 14 years
U.S. Cl. D21—59

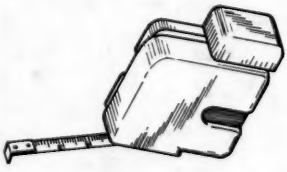
304,740
TOY FENCE
Erling T. Dideriksen, Billund, Denmark, assignor to Interlego A.G., Switzerland
Filed Dec. 2, 1987, Ser. No. 128,471
Term of patent 14 years
U.S. Cl. D21—109



304,741
SIMULATIVE TOY COMPASS
Hiroshi Ukisu, Matsudo, Japan, assignor to Epoch Company, Ltd., Tokyo, Japan
Filed May 20, 1988, Ser. No. 196,338
Term of patent 14 years
U.S. Cl. D21—109

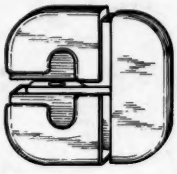
304,742
SIMULATIVE TOY FLASHLIGHT
Hiroshi Ukisu, Matsudo, Japan, assignor to Epoch Company, Ltd., Tokyo, Japan
Filed May 20, 1988, Ser. No. 196,341
Term of patent 14 years
U.S. Cl. D21—109

304,743
SIMULATIVE TOY TAPE MEASURE
Hiroshi Ukisu, Matsudo, Japan, assignor to Epoch Company, Ltd., Tokyo, Japan
Filed May 20, 1988, Ser. No. 196,342
Term of patent 14 years
U.S. Cl. D21—109

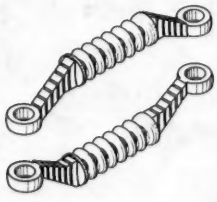


304,744
SIMULATIVE TOY SCISSORS
Hiroshi Ukisu, Matsudo, Japan, assignor to Epoch Company, Ltd., Tokyo, Japan
Filed May 20, 1988, Ser. No. 196,337
Term of patent 14 years
U.S. Cl. D21—120

304,745
SIMULATIVE TOY HOLE PUNCH
Hiroshi Ukisu, Matsudo, Japan, assignor to Epoch Company, Ltd., Tokyo, Japan
Filed May 20, 1988, Ser. No. 196,455
Term of patent 14 years
U.S. Cl. D21—120



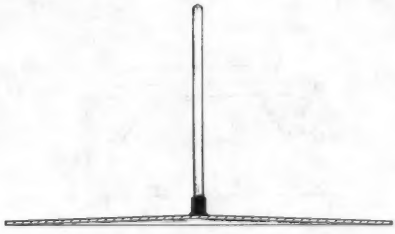
304,746
STEERING ROD FOR A TOY VEHICLE
Ole V. Poulsen, Vejle, Denmark, assignor to Interlego A.G., Switzerland
Filed Dec. 2, 1987, Ser. No. 127,874
Term of patent 14 years
U.S. Cl. D21—141



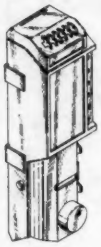
304,747
DOLL
Steven K. Dunlap, and Richard A. Jurczyk, both of Memphis, Tenn., assignors to I.O.O.H., Inc., Memphis, Tenn.
Filed Jan. 26, 1989, Ser. No. 302,723
Term of patent 14 years
U.S. Cl. D21—171

304,748
HAND HELD EXERCISER
Michael Bowers, 1st Floor, No. 4, Lane 754, Chung Shan North Road, Section 6, Taipei, Taiwan
Filed Jan. 20, 1987, Ser. No. 4,693
Term of patent 14 years
U.S. Cl. D21—196

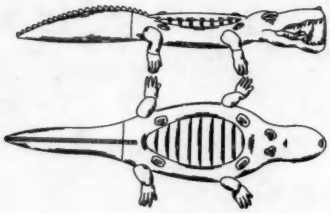
304,749
GOLF COURSE MARKER
Eloise A. K. Johnson; James W. Johnson, both of 1707 Robin Rd., Arlington, Tex. 76013, and Robert E. Johnson, 112 Lake Meadows Dr., Rockwall, Tex. 75087
Filed Nov. 14, 1985, Ser. No. 804,973
Term of patent 14 years
U.S. Cl. D21—234



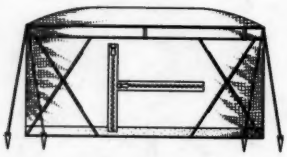
304,750
GOLF BALL DISPENSER
Gerald Fitton, Leeds, and Leonard Walker, Methley, both of England, assignors to Du Bois Public Limited Company, London, England
Filed Feb. 26, 1986, Ser. No. 836,182
Claims priority, application United Kingdom, Sep. 10, 1985, 1029135
Term of patent 14 years
U.S. Cl. D21—234



304,751
FLOAT
Henry S. Wolfe, Gulfport, Fla., assignor to The Frenry Company, Inc., Clearwater, Fla.
Filed Nov. 13, 1987, Ser. No. 121,761
Term of patent 14 years
U.S. Cl. D21—237

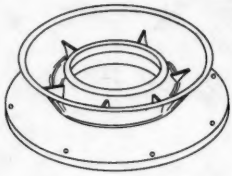


304,752
TENT
James V. Ward, 403 Buttonwood Dr., Kissimmee, Fla. 32743
Filed Nov. 19, 1987, Ser. No. 122,670
Term of patent 14 years
U.S. Cl. D21—253

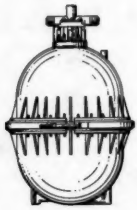


304,753
CRAB-CATCHING RING
Mark H. Whitesell, 922 NW. 61st St., Seattle, Wash. 98107
Filed May 1, 1987, Ser. No. 45,024
Term of patent 14 years
U.S. Cl. D22—121

304,754
FISHING HAND CASTER
Alexander S. Corrie, 36 Manilla Street, East Brisbane, Australia (4169)
Filed Mar. 2, 1987, Ser. No. 20,679
Claims priority, application Australia, Nov. 14, 1986, 7475/86
Term of patent 14 years
U.S. Cl. D22—137



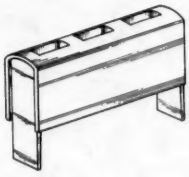
304,755
WATER RESERVOIR FOR A REVERSE OSMOSIS SYSTEM
Bruce D. Burrows, 25145 W. Avenue Standford, Valencia, Calif. 91355
Filed Jan. 23, 1987, Ser. No. 6,589
Term of patent 14 years
U.S. Cl. D23—205



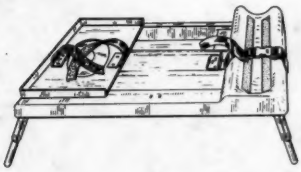
304,756
FLUID HOLDING TANK
Franklin C. Houser, 15520 Donmetz St., Mission Hills, Calif. 91345
Filed Apr. 29, 1987, Ser. No. 43,994
Term of patent 14 years
U.S. Cl. D23—205

304,757
SPRAY GUN
Steven W. Post, Jonesboro, Ark., and Edward A. Bellandi, San Jose, Calif., assignors to FMC Corporation, Chicago, Ill.
Filed Jun. 1, 1987, Ser. No. 56,836
Term of patent 14 years
U.S. Cl. D23—226

304,758
FRAGRANCE CARTRIDGE
Dov Z. Glucksman, Brookline, Mass., and Jorg Ratzlaff, New York, N.Y., assignors to Environmental Fragrance Technologies, Ltd., New York, N.Y.
Filed Sep. 15, 1987, Ser. No. 96,845
Term of patent 14 years
U.S. Cl. D23—366

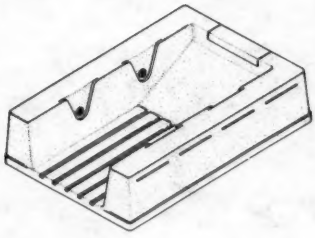


304,759
GURNEY AUXILIARY EQUIPMENT TRAY
Glenn McCloskey, 905 Brookwood Pl., Oceanside, Calif. 92056
Filed Jan. 12, 1987, Ser. No. 2,462
Term of patent 14 years
U.S. Cl. D24—7

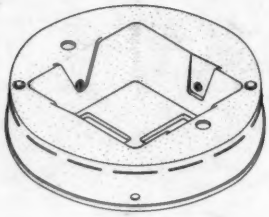


304,760
COMBINED PROSTATE AND VAGINAL ULTRASOUND PROBE
Bobby Curtis, Danville, and Richard A. Terwilliger, San Ramon, both of Calif., assignors to Diasonics, Inc., South San Francisco, Calif.
Filed Jan. 22, 1987, Ser. No. 6,098
Term of patent 14 years
U.S. Cl. D24—17

304,761
SINGLE OCCUPANT WHIRLPOOL LOUNGER FOR USE IN SWIMMING POOLS
E. Eugene Middleton, Rte 4, Box 1420, Haleyville, Ala. 35505
Filed Sep. 14, 1987, Ser. No. 97,071
Term of patent 14 years
U.S. Cl. D24—38



304,762
DOUBLE OCCUPANT WHIRLPOOL LOUNGER FOR USE IN SWIMMING POOLS
E. Eugene Middleton, Rte. 4, Box 1420, Haleyville, Ala. 35505
Filed Sep. 14, 1987, Ser. No. 97,073
Term of patent 14 years
U.S. Cl. D24—38



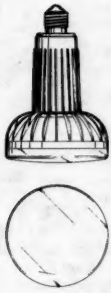
304,763
BABY BOTTLE
Arthur H. Yuan, Hudson, and John Kostantaras, Brecksville, both of Ohio, assignors to Spalding & Evenflo Companies, Tampa, Fla.
Filed Aug. 7, 1987, Ser. No. 82,768
Term of patent 14 years
U.S. Cl. D24—47

304,764
DECORATIVE GLASS PANEL
B. Jeremiah Shaffer, Worthington, Ohio, assignor to Pease Industries, Inc., Fairfield, Ohio
Filed Jul. 7, 1986, Ser. No. 882,815
Term of patent 14 years
U.S. Cl. D25—103

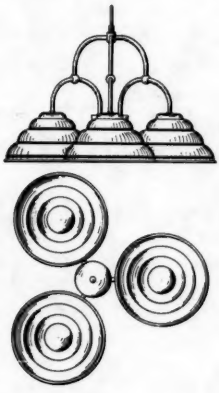
304,765
DECORATIVE GLASS PANEL
B. Jeremiah Shaffer, Worthington, Ohio, assignor to Pease Industries, Inc., Fairfield, Ohio
Filed Jul. 7, 1986, Ser. No. 882,817
Term of patent 14 years
U.S. Cl. D25—103

304,766
DAMPER SEALING STRIP
Milo Weaver, Box 26, U.S. Rte. 62, Winesburg, Ohio 44690, and Dean Miller, 1900 U.S. 62, Wilmot, Ohio 44689
Filed May 1, 1987, Ser. No. 44,565
Term of patent 14 years
U.S. Cl. D25—119

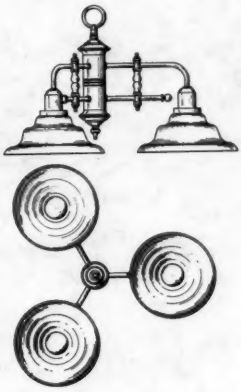
304,767
FLUORESCENT LIGHTING FIXTURE OR SIMILAR ARTICLE
Kenneth Lim, Piedmont, Calif., assignor to Lumatech Corp., Emeryville, Calif.
Filed Aug. 12, 1988, Ser. No. 895,685
Term of patent 14 years
U.S. Cl. D26—26



304,768
CHANDELIER OR THE LIKE
Vince Dicola, Louisville, Ky., assignor to Thomas Industries Inc., Louisville, Ky.
Filed Jul. 6, 1987, Ser. No. 69,955
Term of patent 14 years
U.S. Cl. D26—84

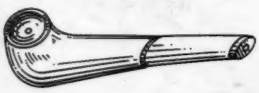


304,769
LIGHT FIXTURE OR THE LIKE
Robert De'Armond, Louisville, Ky., assignor to Thomas Industries Inc., Louisville, Ky.
Filed Jul. 6, 1987, Ser. No. 69,957
Term of patent 14 years
U.S. Cl. D26—84

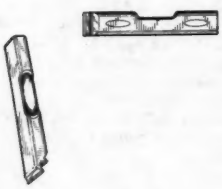


304,770
DECORATIVE REFLECTOR FOR LOW-VOLTAGE, OUTDOOR ACCENT LIGHTS
Robert J. De brey, 4502 Browndale Ave., Edina, Minn. 55424, and Bruce W. Carlson, Minneapolis, Minn., assignors to Robert J. De brey, Edina, Minn.
Filed Apr. 24, 1986, Ser. No. 857,610
Term of patent 14 years
U.S. Cl. D26—118

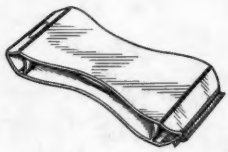
304,771
PIPE
Yutaka Katayama, Tokyo, Japan, assignor to Aruman Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 29, 1988, Ser. No. 176,811
Term of patent 14 years
U.S. Cl. D27—163



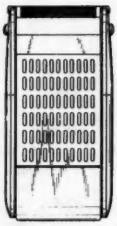
304,772
SAFETY RAZOR
Roland Beuchat, Cologny, Switzerland, assignor to Synertrade and Finance S.A., Carouge, Switzerland
Filed Oct. 10, 1986, Ser. No. 917,510
Claims priority, application Int'l Pat. Institute, Apr. 10, 1986, DMA/000 488
Term of patent 14 years
U.S. Cl. D28—46

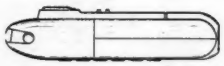


304,773
SAFETY RAZOR
Roland Beuchat, Cologny, Switzerland, assignor to Synertrade and Finance S.A., Carouge, Switzerland
Filed Oct. 10, 1986, Ser. No. 917,511
Claims priority, application Int'l Pat. Institute, Apr. 10, 1986, DMA/000 488
Term of patent 14 years
U.S. Cl. D28—46



304,774
ELECTRIC SHAVER
Kazuyoshi Yonesawa; Yonosuke Iwai, both of Kadoma, Japan, and Florian Seiffert, Wiesbaden, Fed. Rep. of Germany, assignors to Matsushita Electric Works, Ltd., Osaka, Japan
Filed Sep. 4, 1987, Ser. No. 92,994
Claims priority, application Japan, Mar. 10, 1987, 62-9144
Term of patent 14 years
U.S. Cl. D28—49





LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 21ST DAY OF NOVEMBER, 1989

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

: *See*—
Isozumi, Shuzoo, 4,881,416, Cl. 74-7.00A.

A. H. Robins Company, Incorporated: *See*—
Walsh, David A.; and Yanni, John M., 4,882,330, Cl. 514-255.000.

A.T.B. S.p.A.: *See*—
Bordignon, Abramo, 4,882,645, Cl. 360-132.000.

ABC/Sebrn Tech Corp.: *See*—
Shannon, Joseph W., 4,882,097, Cl. 261-35.000.

Abe, Kiyoto: *See*—
Nasu, Masahiro; and Abe, Kiyoto, 4,882,639, Cl. 360-65.000.

Abe, Kouji: *See*—
Sakurai, Yoshihiro; Fukuda, Yoshihide; and Abe, Kouji, 4,881,370, Cl. 60-310.000.

Abe, Masaru: *See*—
Sano, Shoichi; Furukawa, Yoshimi; Ogura, Masami; Abe, Masaru; and Oyama, Yasuharu, 4,881,748, Cl. 280-91.000.

Abe, Takao: *See*—
Koshizuka, Kunihiro; and Abe, Takao, 4,882,218, Cl. 428-216.000.

Abe, Yoshio: *See*—
Kageyama, Sadashi; Abe, Yoshio; Yasumoto, Yoshio; Inoue, Shuji; Takai, Hitoshi; Matsumoto, Mitsujiro; Aono, Kouji; Uchimura, Kiyoshi; and Iwasaki, Eiji, 4,882,614, Cl. 358-12.000.

Abe, Yoshitaka; and Murakami, Keiichi, to Fujitsu Limited. Frequency counter for counting a frequency and partly varied frequencies of a signal in real time. 4,882,740, Cl. 377-49.000.

Abou-Gharbia, Magid A.; Yardley, John P.; and Childers, Wayne E., Jr., to American Home Products Corporation. Polycyclic-carbamic acid piperazinoalkyl esters and amides. 4,882,432, Cl. 544-295.000.

Abreo, William A., Jr. Subsea guidebase. 4,881,850, Cl. 405-169.000.

AbuJodom, David N., II: *See*—
Thoma, Paul E.; AbuJodom, David N., II; and Fariabi, Sepehr, 4,881,981, Cl. 148-11.50R.

Ackerman, Marvin: *See*—
Hollis, Robert; Lewis, John E.; and Ackerman, Marvin, 4,882,678, Cl. 364-413.310.

Adachi, Koji: *See*—
Marugama, Kazuo; Horie, Kiyoshi; Noami, Tsuneo; Yamamoto, Toshiro; Adachi, Koji; Okamoto, Toru; Sumikawa, Takeshi; and Nobumasa, Furuya, 4,882,247, Cl. 430-45.000.

Adair, Paul C.: *See*—
O'Connor, Joseph G.; and Adair, Paul C., 4,882,259, Cl. 430-138.000.

Adam, William D. Electrostatic charge dissipator and method of making. 4,881,642, Cl. 206-328.000.

Adams, U.S.A., Inc.: *See*—
Orsatti, Louis A., 4,881,735, Cl. 273-25.000.

Adkins, Richard C., to British Aerospace PLC. Boundary layer control in supersonic nozzle. 4,881,875, Cl. 417-54.000.

Advanced Micro Devices, Inc.: *See*—
Johansson, Jan H.; and Lunderius, Erik K., 4,882,506, Cl. 307-296.100.
Witt, David B., 4,882,673, Cl. 364-200.000.

Aeration Industries, Inc.: *See*—
Durda, Joseph A.; and Giese, Thomas G., 4,882,099, Cl. 261-128.000.

Aeroquip Corporation: *See*—
Fournier, Paul J. E.; Kulikowski, Ernest F.; and Allread, Alan R., 4,881,569, Cl. 137-360.000.

Affarsverket FFV: *See*—
Medin, Gunnar; Olsson, Erik; Sjoo , Lennart; and Lundgren, Roger, 4,881,448, Cl. 89-36.020.

Agency of Industrial Science and Technology: *See*—
Inoue, Yasunori; and Hanafusa, Hiroshi, 4,882,300, Cl. 437-236.000.

Agency of Industrial Science & Technology, Extra-Ministerial Bureau of Ministry of Trade & Industry: *See*—
Uehara, Toshihiro; and Watanabe, Rikizo, 4,882,124, Cl. 420-74.000.

Agharkar, Shreeram N.: *See*—
Nassar, Munir N.; Agharkar, Shreeram N.; and Bogardus, Joseph B., 4,882,356, Cl. 514-619.000.

Agostoni, Alberto; D'Agostino, Alfredo; Craighero, Enrico; and Marazza, Renzo, to Tecnomare S.p.A. Four-leg trestlework structure for supporting an off-shore platform. 4,881,620, Cl. 182-179.000.

Ahad, Elie, to Canada, Her Majesty the Queen in right of, as represented by Minister of National Defence of Her Majesty's Canadian Government. Branched hydroxy-terminated aliphatic polyethers. 4,882,395, Cl. 525-407.000.

Aihara, Kenji: *See*—
Kanbara, Susumu; Aihara, Kenji; Tomiku, Masato; Kawashima, Yoshio; Sawada, Tadashi; Okuda, Shinji; and Ikeda, Mitsuaki, 4,881,987, Cl. 148-12.00B.

Air Products and Chemicals, Inc.: *See*—
Kramer, Daniel P.; Santangelo, Joseph G.; and Weber, James J., 4,882,110, Cl. 264-63.000.
Mattiola, Paul A.; and Van Ommeren, James, 4,881,374, Cl. 62-50.600.
Mattiola, Paul A.; and VanOmmeren, James, 4,881,375, Cl. 62-50.600.
Schweighardt, Frank K.; and Bailey, Webb I., 4,881,682, Cl. 228-242.000.

Airpax Corporation: *See*—
Harper, George S., 4,882,557, Cl. 335-9.000.

Aisin Aw Co., Ltd.: *See*—
Nimura, Mitsuhiro; and Yokoyama, Shoji, 4,882,696, Cl. 364-449.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Kondo, Toshio, 4,881,623, Cl. 188-73.380.
Naito, Yoshihiro, 4,881,372, Cl. 60-521.000.
Takayanagi, Makoto, 4,882,558, Cl. 335-260.000.

Aisin Seiki Kabushikikaisha: *See*—
Nakashima, Hiroshi; Sakakibara, Naoji; and Fushimi, Takehiko, 4,881,611, Cl. 180-79.100.
Yasuda, Tomio; Aoki, Kohji; and Mori, Kazuo, 4,881,456, Cl. 98-2.010.

Ajmera, Prakash R., to Owens-Illinois Plastic Products Inc. Method for making partially crystalline biaxially oriented heat set hollow plastic containers. 4,882,119, Cl. 264-526.000.

Akaba, Yukio; and Sakuramoto, Akihiko, to Sony Corp.; and SMK Co., Ltd. Multi-drop type bus line system. 4,882,554, Cl. 333-105.000.

Akademie Der Wissenschaften Der DDR: *See*—
Rosenthal, Andre; Hunger, Hans-Dieter; Kagelmaker, Horst; and Gratschus, Monika, 4,882,127, Cl. 422-50.000.

Akaiwa, Yoshihiko, to NEC Corporation. Terminal station of a radio communication network capable of effectively using radio channels assigned to the network. 4,882,766, Cl. 455-58.000.

Akiyama, Keiho: *See*—
Shinsha, Takao; Morita, Masato; Sakataya, Yoshinori; Tsuchiya, Yoji; Hikosaka, Mitsuhiro; Koshishita, Junji; Akiyama, Keiho; and Kubo, Takashige, 4,882,690, Cl. 364-490.000.

Akiyama, Toru, to Pioneer Electronic Corporation. Improved definition television set with external luminance and chrominance signal inputs. 4,882,625, Cl. 358-140.000.

Akzo NV: *See*—
Schmer, Gottfried, 4,882,060, Cl. 210-646.000.
Schutyser, Jan A. J.; and Buser, Antonius J. W., 4,882,226, Cl. 428-407.000.

Alameda, Daniel; and Cooper, Scott, to Rubber Band Technology. Apparatus and method for rapid transport of an elastic band. 4,881,868, Cl. 414-773.000.

Alameel, George M.; and Hammond, Rodney W., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Self-adjusting optical fiber connector assembly. 4,881,792, Cl. 350-96.200.

Alavanja, Milan: *See*—
Pielet, Howard M.; Frank, Larry A.; Edgar, William; and Alavanja, Milan, 4,881,990, Cl. 148-320.000.

Albany International Corp.: *See*—
FitzPatrick, Keith, 4,882,217, Cl. 428-212.000.

Albert, Henry J.: *See*—
Hukvari, Istvan S.; Albert, Henry J.; Moon, Vernon G.; and Steffenson, Michael R., 4,882,128, Cl. 422-119.000.

Albright & Wilson Limited: *See*—
Collier, John R.; and Holker, Kenneth U., 4,881,975, Cl. 106-14.050.

Aldrige, Clyde L.: *See*—
Eidt, Clarence M., Jr.; Aldrige, Clyde L.; and Bearden, Roby, Jr., 4,882,036, Cl. 208-50.000.

Aleem, Mohd A.: *See*—
Flygare, Wayne A.; Olson, Raymond N.; Reynolds, Richard W.; and Aleem, Mohd A., 4,882,513, Cl. 310-114.000.

Alfa Lancia Industriale S.p.A.: *See*—
Villa, Ezio; and Biazzi, Giuseppe, 4,881,391, Cl. 70-455.000.

Alfacell Corporation: *See*—
Shogen, Kuslima; Mikulski, Stanislaw M.; and Ardelt, Wojciech J., 4,882,421, Cl. 530-350.000.

Alfon, Jose ; Martinez, Alberto; and Martinez, Abelardo. Anti-theft device for automobile vehicles. 4,881,389, Cl. 70-209.000.

Alfred Grass Ges.m.b.H. Metallwarenfabrik: *See*—
Grass, Alfred, 4,881,826, Cl. 384-19.000.

Alko Limited: *See*—
Sinclair, John D., 4,882,335, Cl. 514-282.000.

Allen, Alfred M., to General Motors Corporation. Headlamp assembly. 4,882,658, Cl. 362-61.000.

Allen-Bradley Company, Inc.: *See*—
Struger, Odo J.; Luboski, Mark; and Murphy, Timothy J., 4,882,702, Cl. 364-900.000.

Allied Gator, Inc.: *See*—
Ramun, John R., 4,881,459, Cl. 100-95.000.

Allington, Robert W.; and Jones, John N., to Isco, Inc. Chromatographic system. 4,882,063, Cl. 210-659.000.

Allington, Robert W., to Isco, Inc. Method for predicting steady-state conditions. 4,882,781, Cl. 364-510.000.

Allread, Alan R.: *See*—
Fournier, Paul J. E.; Kulikowski, Ernest F.; and Allread, Alan R., 4,881,569, Cl. 137-360.000.

Allsop, Bryan E.: *See*—
Smith, Kevin K.; Allsop, Bryan E.; and Naik, Seb, 4,882,482, Cl. 250-214.00A.

Alopex Industries, Inc.: *See*—
Ritter, Gregory A.; Barton, Graham; and Sargent, Ronald J., 4,881,870, Cl. 415-47.000.

Alps Electric Co., Ltd.: *See*—
Baba, Toshiki, 4,882,550, Cl. 331-49.000.
Nasu, Masahiro; and Abe, Kiyoto, 4,882,639, Cl. 360-65.000.

Altman, Michael P., to United Technologies Corporation. Modular UV preionization package for a CO_2 laser. 4,882,735, Cl. 372-86.000.

Altus Technology Corporation: *See*—
Smith, Leonard S.; and Cook, Gary L., 4,881,873, Cl. 417-12.000.

Aluminum Company of America: *See*—
Weaver, Mark L., 4,882,017, Cl. 204-71.000.

Alvarez, Dennis A.: *See*—
Bosl, George F.; Kelly, Patrick M.; Alvarez, Dennis A.; Sauer, Gale; and Hocevar, Joseph A., 4,881,355, Cl. 52-738.000.

Amano, Kozo: *See*—
Kagawa, Junichi; Saiki, Yoshiaki; and Amano, Kozo, 4,881,403, Cl. 73-115.000.

Amano, Nobuhiko: *See*—
Uekusa, Tadashi; Koizumi, Takashi; and Amano, Nobuhiko, 4,882,544, Cl. 324-511.000.

Amato, Joseph G., to Hitch Lift, Inc. Boom hoist for attachment to a trailer hitch drawbar. 4,881,864, Cl. 414-543.000.

American Angler Corporation: *See*—
Davis, F. Darell, 4,881,340, Cl. 42-42.060.

American Crystal Sugar Company: *See*—
Olson, Roland F.; and Fergle, Richard R., 4,882,190, Cl. 426-541.000.

American Cyanamid Company: *See*—
Balwant, Singh; and Forgione, Peter S., 4,882,385, Cl. 525-123.000.
Casey, Donald J.; and Rosati, Louis, 4,882,168, Cl. 424-468.000.
Donovan, Stephen F., 4,882,080, Cl. 252-117.000.
Iwaskow, Richard S.; and Crum, Stephen M., 4,882,089, Cl. 428-242.000.

American Home Products: *See*—
Winkley, Michael W.; and Diebold, James L., 4,882,323, Cl. 514-183.000.

American Home Products Corporation: *See*—
Abou-Gharbia, Magid A.; Yardley, John P.; and Childers, Wayne E., Jr., 4,882,432, Cl. 544-295.000.

American Locker Group Incorporated: *See*—
Norton, Allen R., 4,881,653, Cl. 220-22.300.

American National Can Company: *See*—
Hsu, Joseph C.; and Guckenberger, Anthony C., 4,881,649, Cl. 206-634.000.
Webster, Charles A.; and John, Christian J., 4,881,892, Cl. 425-577.000.

American Telephone and Telegraph: *See*—
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American Telephone and Telegraph Company: *See*—
Anderl, Ewald C.; Frankel, Oren; and Zahavi, Avi, 4,882,474, Cl. 235-380.000.

American Telephone and Telegraph Company, AT&T Bell Laboratories: *See*—
Alameel, George M.; and Hammond, Rodney W., 4,881,792, Cl. 350-96.200.
Mollenauer, Linn F., 4,881,790, Cl. 350-96.160.

Ammon, J. Preston; and Kendal, Jerry, to Augat Inc. Modular electrical connector. 4,881,904, Cl. 439-78.000.

Amoco Corporation: *See*—
Kelsey, Donald R., 4,882,397, Cl. 525-471.000.
Warren, Tommy M.; Winters, Warren J.; and Brett, Jame F., 4,881,605, Cl. 175-320.000.

Amos, Michael D.; Brosnan, Denis A.; Samas, Mark V.; Singer, Richard E.; Whetsel, James E.; and Kovarik, David P., to Erico International Corporation. Exothermic welding apparatus including a baffle cover assembly. 4,881,677, Cl. 228-33.000.

AMP Incorporated: *See*—
Demler, Henry W., Jr.; Dola, Frank P.; Kimmel, David J.; Lauterbach, John H.; Sotolongo, Thomas J.; and Zwieg, Grover A., 4,881,905, Cl. 439-79.000.
Haddock, John T.; Miller, Charles A.; Moist, Stanford C., Jr.; Nauman, Warren D.; and Pala, Ronald S., 4,881,911, Cl. 439-484.000.
Komuro, Katsumi, 4,881,321, Cl. 29-861.000.

Amplas, Inc.: *See*—
Wech, Robert J., 4,881,933, Cl. 493-225.000.

Amsler, John J.: *See*—
Dickey, Larry A.; and Amsler, John J., 4,881,341, Cl. 43-42.120.

Anamartic Limited: *See*—
Sinclair, Alan W., 4,882,706, Cl. 365-180.000.

Anderl, Ewald C.; Frankel, Oren; and Zahavi, Avi, to American Telephone and Telegraph Company; and AT&T Information Systems Inc. Security file system and method for securing data in a portable data carrier. 4,882,474, Cl. 235-380.000.

Anderley, John J.: *See*—
McMillen, Ronald R.; and Anderley, John J., 4,882,116, Cl. 264-254.000.

Anderson, Dirk M.; Baker, Paul E.; Cantrell, Michael A.; Cerretti, Douglas P.; Cosman, David J.; Gimpel, Steven D.; Grabstein, Kenneth H.; Larsen, Alf D.; and McKereghan, Kate N., to Immunex Corporation. DNA sequences encoding bovine interleukin-2. 4,882,282, Cl. 435-252.300.

Anderson, Nevil J.: *See*—
Dixon, David R.; and Anderson, Nevil J., 4,882,064, Cl. 210-667.000.

Ando, Yoshio; Ishige, Yoshiki; Kinugasa, Toshiyuki; and Sato, Shoji, to Honda Giken Kabushiki Kaisha. Process of manufacturing a composite panel for shock absorption. 4,882,002, Cl. 156-310.000.

Andreasen, Norman H. Throttle cable control assembly for carburetors. 4,881,503, Cl. 123-400.000.

Andreesen, Sara. Handle cover and toy holder. 4,881,746, Cl. 280-33.992.

Andrews, Anthony J.; and Hunt, Toby C., to Turbosound Limited. Adaptor for coupling plural compression drivers to a common horn. 4,882,562, Cl. 340-388.000.

Andrews, Dana; and Hanawa, Hiroji, to Sharp Kabushiki Kaisha. Ozone generator cell. 4,882,129, Cl. 422-186.200.

Andrus, James H., to Honeywell, Inc. Electromagnetic force sensor. 4,882,512, Cl. 310-90.500.

Angell, Cyril N. E., to Avon Industrial Polymers Limited. Respirator air guide. 4,881,538, Cl. 128-201.150.

Aoike, Tatsuyuki; Sano, Masafumi; Yoshino, Takehito; Kariya, Toshimitsu; and Niino, Hiroaki, to Canon Kabushiki Kaisha. Light receiving member having a multilayered light receiving layer composed of a lower layer made of aluminum-containing inorganic material and an upper layer made of non-single-crystal silicon material. 4,882,251, Cl. 430-57.000.

Aoki, Hachiro; Kobayashi, Tadashi; Kuronuma, Junya; and Kikuchi, Hideya, to Diesel Kiki Co., Ltd. Stepless speed variator of a belt type. 4,881,926, Cl. 474-25.000.

Aoki, Kohji: *See*—
Yasuda, Tomio; Aoki, Kohji; and Mori, Kazuo, 4,881,456, Cl. 98-2.010.

Aoki, Shigeo; Miyake, Katsumi; and Ugai, Yasuhiro, to Hosiden Electronics Ltd. Color liquid crystal display device. 4,881,797, Cl. 350-339.00F.

Aoki, Shinji: *See*—
Maezawa, Akihiko; Nakajima, Yoshio; Kaneko, Mitsuyoshi; and Aoki, Shinji, 4,882,020, Cl. 204-157.300.

Aoki, Yoshihito, to Yazaki Corporation. Navigation system using angular rate sensor. 4,882,689, Cl. 364-449.000.

Aono, Kouji: *See*—
Kageyama, Sadashi; Abe, Yoshio; Yasumoto, Yoshio; Inoue, Shuji; Takai, Hitoshi; Matsumoto, Mitsujiro; Aono, Kouji; Uchimura, Kiyoshi; and Iwasaki, Eiji, 4,882,614, Cl. 358-12.000.

Aoyagi, Yoshio: *See*—
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Aoyama, Takeshi: *See*—
Wakiyama, Yoshihiro; Aoyama, Takeshi; and Ohnishi, Yoshiro, 4,882,503, Cl. 307-267.000.

Aptel, Philippe; and Espenan, Jean-Michel, to Institut National de Recherche Chimique Appliquee (IRCHA); and Centre National de la Recherche Scientifique. Hollow fibers production method thereof and their applications particularly in the field of membrane-type separations. 4,882,223, Cl. 428-398.000.

Arai, Mitutaka: *See*—
Ikeuchi, Satoru; Arai, Mitutaka; Okuyama, Yuki; and Matsubara, Akitoshi, 4,882,258, Cl. 430-108.000.

Arai, Naoto; Nojima, Masaharu; and Mandoh, Ritsuo, to Kanzaki Paper Manufacturing Co., Ltd. Heat-sensitive recording material with heat-sensitive color developing layer containing prismatic calcium carbonate. 4,882,310, Cl. 503-207.000.

Arai, Tetsuji: *See*—
Suzuki, Shinji; Arai, Tetsuji; Ueki, Kazuyoshi; Mimura, Yoshiki; and Suzuki, Hiroko, 4,882,263, Cl. 430-328.000.

Arai, Yoshiaki: *See*—
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Arai, Yoshihisa: *See*—
Tsujihara, Kenji; Arai, Yoshihisa; Ohtsuki, Osamu; and Nakatani, Tadashi, 4,882,447, Cl. 556-40.000.

Arai, Yoshio: *See*—
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Araki, Yousai: *See*—
Sugimori, Yoshio; Araki, Yousai; Kurosaki, Tadao; and Urano, Joji, 4,882,628, Cl. 358-167.000.

Aranyi, Ernest: *See*—
Green, David T.; and Aranyi, Ernest, 4,881,544, Cl. 227-178.000.

Aratani, Katsuhisa, to Sony Corporation. Magneto-optical recording medium. 4,882,231, Cl. 428-611.000.

Archery Designs, Inc.: *See*—
Peck, Paul L., 4,881,516, Cl. 124-35.00A.

Ardac, Inc.: *See*—
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Ardelt, Wojciech J.: *See*—
Shogen, Kuslima; Mikulski, Stanislaw M.; and Ardelt, Wojciech J., 4,882,421, Cl. 530-350.000.

Arenz, Helmut, to DSG Schrumpfschlauch GmbH. Method and assembly kit for forming defined longitudinally watertight sections in wirings comprising a plurality of individual strands and/or cable strands. 4,881,995, Cl. 156-52.000.

Argo Instruments Inc.: *See*—
Martinez, Antonio, 4,882,570, Cl. 340-574.000.

Arimatsu, Youichirou: *See*—
Yamaguchi, Hideya; Hayasaki, Hiroyuki; Kawakami, Masamichi; Houjiyou, Yuji; Hobo, Yoshihiro; Arimatsu, Youichirou; Tsuji, Yasunori; Hasegawa, Masaaki; and Katou, Seiji, 4,882,630, Cl. 358-451.000.

Arimoto, Akira: *See*—
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Arimoto, Nozomu, to Matsushita Electronics Corporation. Deflection yoke for a color cathode ray tube. 4,882,521, Cl. 313-440.000.

Aristacom International, Inc.: *See*—
Williams, Stephen J.; and Traster, Elden D., 4,882,727, Cl. 370-79.000.

Arma, Inc.: *See*—
Bubien, Ray, 4,881,779, Cl. 297-442.000.

Armstrong, Douglas C., to General Motors Corporation. Servo mechanism for actuating a friction band assembly in a planetary gear set. 4,881,453, Cl. 92-84.000.

Armstrong, James: *See*—
May, Barry A.; and Armstrong, James, 4,881,288, Cl. 15-98.000.

Armstrong World Industries, Inc.: *See*—
Balmer, Richard H.; and Pfeiffer-Meshaw, Barbara A., 4,881,999, Cl. 156-231.000.

Arnaud, Annick. Process for the enhancement of light structures and light instrument. 4,882,661, Cl. 362-242.000.

Arnoldt, Peter J., to Ductmate Industries, Inc. Duct connector for a circular duct. 4,881,762, Cl. 285-367.000.

Artinyan, Arto; and Krzyston, John, to Cuno, Incorporated. Method of forming a cell filter with an exposed surface. 4,881,313, Cl. 29-163.800.

Aruga, Tomoe: *See*—
Kimura, Ippo; Okumura, Naoyuki; Aruga, Tomoe; and Arai, Yoshio, 4,882,644, Cl. 360-104.000.

Asahi Glass Company, Ltd.: *See*—
Maruyama, Tsutomu; Matsumoto, Hidetoshi; and Miyake, Yoshiyuki, 4,882,209, Cl. 428-34.100.

Asai, Fumiyasu: *See*—
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Asai, Junichi: *See*—
Kobayashi, Takeshi; and Asai, Junichi, 4,881,878, Cl. 417-295.000.

Asai, Katsuya; and Masaki, Hideyuki, to NGK Insulators, Ltd. Porous structure of fluid contact. 4,882,130, Cl. 422-310.000.

Asakura, Masahiko: *See*—
Sato, Hiromitsu; Kubota, Shinichi; Totsune, Atsushi; and Asakura, Masahiko, 4,882,538, Cl. 324-127.000.

Asami, Ken: *See*—
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Asano, Masamichi: *See*—
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Asaumi, Shingo: *See*—
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Ashimori Kogyo Kabushiki Kaisha: *See*—
Zenbayashi, Katsuaki; Otsuga, Hisao; Morinaga, Akio; Toyoshima, Osamu; and Shimokawa, Shinji, 4,882,470, Cl. 219-523.000.

Ashland Oil, Inc.: *See*—
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Asics Corporation: *See*—
Teranishi, Mitsuji; Watanabe, Yasuo; and Takeuchi, Akira, 4,882,580, Cl. 340-825.510.

Asmussen, Hans P. Traveler control. 4,881,481, Cl. 114-204.000.

Associated Universities, Inc.: *See*—
Skotheim, Terje A.; Okamoto, Yoshiyuki; and Lee, Hung S., 4,882,243, Cl. 429-192.000.

Asta Pharma Akteingesellschaft: *See*—
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AT&T Bell Laboratories: *See*—
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AT&T Information Systems Inc.: *See*—
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Atlantic Richfield Company: *See*—
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Atlas Copco Aktiebolag: *See*—
Hankvist, Bo A.; Kling, Peter N.; and Spongh, Rolf T., 4,881,688, Cl. 239-691.000.
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Aug. Winkhaus GmbH & Co. KB: *See*—
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Augat Inc.: *See*—
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Mendenhall, David W.; Marian, Steve P.; Goff, Jay T.; Cotter, Neil J.; and Corbesero, Steve R., 4,881,901, Cl. 439-65.000.

August Sauter GmbH: *See*—
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Austin, James R.: *See*—
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Autry Industries, Inc.: *See*—
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Avakian, Roger W.: *See*—
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Avery International Corporation: *See*—
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Slobodkin, Yefim, 4,881,936, Cl. 493-355.000.

Avon Industrial Polymers Limited: *See*—
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AVX Corporation: *See*—
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Ayers, David B. Manipulative amusement device. 4,881,738, Cl. 273-153.00S.

Ayers, Joe W., to Texas Instruments Incorporated. Separable drive coupling using metal bellows. 4,881,922, Cl. 464-79.000.

Baba, Hideki: *See*—
Maeda, Hirokazu; Yamaguchi, Mayumi; Uchiyama, Tetsuya; Baba, Hideki; Matsunami, Hidenobu; Ebihara, Yoshitaka; and Kanegae, Junji, 4,882,192, Cl. 426-607.000.

Baba, Toshiki, to Alps Electric Co., Ltd. Oscillator/amplifier connecting structure. 4,882,550, Cl. 331-49.000.

Babcock-Hitachi Kabushiki Kaisha: *See*—
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Okada, Osamu; Morita, Shigeki; Nakashita, Shigeto; Masai, Tadahisa; Tominaga, Shigeru; and Inada, Hiroshi, 4,881,474, Cl. 110-263.000.

Backu, Konrad, to August Sauter GmbH. Platform scale. 4,881,607, Cl. 177-256.000.

Badenhorst, Rudolf P.: *See*—
Beeton, Thomas B.; Mostert, Roelof J.; Navarro, Emilia B.; Rosinger, Pierre R.; and Badenhorst, Rudolf P., 4,881,991, Cl. 148-325.000.

Baglioni, Alessandro, to Sigma-Tau Industrie Farmaceutiche Riunite S.p.A. Pyrrolacetic amides having antiinflammatory activity. 4,882,349, Cl. 514-423.000.

Bahl, Lalit R.; deSouza, Peter V.; Mercer, Robert L.; and Picheny, Michael A., to International Business Machines Corporation. Synthesizing word baseforms used in speech recognition. 4,882,759, Cl. 381-51.000.

Bailey, Webb I.: *See*—
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Bair, Kenneth W., to Burroughs Wellcome Co. Carbocyclic derivatives. 4,882,358, Cl. 514-654.000.

Baker Hughes, Incorporated: *See*—
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Baker, Paul E.: *See*—
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Bakker, Jan: *See*—
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Ballestrazzi, Aris; and Tassi, Lamberto, to Sitma-Societa Italiana Macchine Automatiche, S.p.A. Packaging machine for the continuous packaging of products having a variable size. 4,881,357, Cl. 53-64.000.

Ballu, Patrick J. M., to Tecnoma. Portable liquid sprayer, particularly for the treatment of plants. 4,881,687, Cl. 239-332.000.

Balmer, Richard H.; and Pfeiffer-Meshaw, Barbara A., to Armstrong World Industries, Inc. Process for the preparation of decorative surface coverings with dot patterns. 4,881,999, Cl. 156-231.000.

Balsam Sportstattenbau & Co. KG: *See*—
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Baltensperger, Werner: *See*—
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Balwant, Singh; and Forgione, Peter S., to American Cyanamid Company. 1,3,5-tris(1-isocyanatomethylethyl)benzene in polyurethanes. 4,882,385, Cl. 525-123.000.

Bannister, Ray L.; Close, Frederick C.; and Coeber, Peter J., to Pitney Bowes Inc. Postage meter and control arrangement for same. 4,881,460, Cl. 101-91.000.

Baranczuk, Richard J.; and Spicer, Jay A., to Bio-Medical Research Laboratories, Inc. Tissue imaging utilizing labelled steroids. 4,882,141, Cl. 424-1.100.

Baratz, Jacob: *See*—
Ninio, Jacob; Baratz, Jacob; and Moshe, Haim, 4,881,463, Cl. 102-202.200.

Barder, Timothy J., to UOP. Purification of sterols with activated carbon as adsorbent and chlorobenzene as desorbent. 4,882,065, Cl. 210-674.000.

Bardos, Thomas J.; Ho, Yau-Kwan; Kasper, Steven J.; and Hughes, Robert G., Jr., to Research Foundation of State University of New

York, The. Novel polynucleotide analogs, methods for inhibiting nucleic acid polymerases and methods for inducing synthesis of interferon. 4,882,147, Cl. 424-85.400.
Barilla G.E R. F.LLI - Societa per Azioni: *See—*
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Barmag, AG: *See—*
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Barnes, Graciela. Securing device and method for holding a child upright on a swing seat. 4,881,780, Cl. 297-467.000.
Barnhart, Daniel H. Apparatus and method for soil decontamination. 4,882,021, Cl. 204-157.150.
Barreto, Demostenis A. W.: *See—*
Franco, Zadson d. A.; and Barreto, Demostenis A. W., 4,881,599, Cl. 166-284.000.
Barry, Andrew S. Moulded resin article. 4,881,890, Cl. 425-543.000.
Barthelemy, Odon: *See—*
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Bartkowiak, Klaus; Graf, Joachim; Urbahn, Friedrich; and Weber, Klaus, to Barmag, AG. Yarn traversing apparatus for a winding machine. 4,881,694, Cl. 242-43.00R.
Bartley, Donald R.: *See—*
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Barton, Graham: *See—*
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Bartoszek, Edward J., to Pennwalt Corporation. Low smoke and reduced flame fluorinated polymer compositions and cable constructions. 4,881,794, Cl. 350-96.230.
Bartz, Richard O. Fluid collection container. 4,881,650, Cl. 220-1.00C.
Barzaghi, Fernando: *See—*
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BASF Aktiengesellschaft: *See—*
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Saupe, Thomas; Klebe, Gerhard; Schirmer, Ulrich; Paul, Gerhard; Kober, Reiner; Wuerzer, Bruno; Berghaus, Rainer; Meyer, Norbert; and Westphalen, Karl-Otto, 4,881,969, Cl. 71-94.000.
BASF Corporation: *See—*
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Bastetti, Giuseppe; and Veronesi, Sergio, to Barilla G.E R. F.LLI - Societa per Azioni. Method of making long-term preservation cooked pasta products ready for consumption. 4,882,191, Cl. 426-557.000.
Basu, Swapan K.: *See—*
Nishimura, Tetsuhiko; Basu, Swapan K.; Chida, Yukio; Oguri, Yasuo; and Inoue, Shoko, 4,882,078, Cl. 252-629.000.
Batcheller, Tom A.: *See—*
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Battelle Memorial Institute: *See—*
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Batts, Inc.: *See—*
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Batzill, Wolfgang; Heilmann, Ulrich; Streitberger, Hans J.; Guder, Harald; and Beck, Fritz, to BASF Lacke & Farben Aktiengesellschaft. Electrophoretically overcoatable coatings applied by electrocoating. 4,882,090, Cl. 252-511.000.
Bauer, Hans J.; Bauer, Hans-Peter; and Stadelmann, Ludwig, to Fritz Bauer + Sohne oHG. Double-damped gas spring with friction liner and sealing ring. 4,881,723, Cl. 267-64.120.
Bauer, Hans-Peter: *See—*
Bauer, Hans J.; Bauer, Hans-Peter; and Stadelmann, Ludwig, 4,881,723, Cl. 267-64.120.
Bauer, Wolfgang; Steckelberg, Willi; and Ritter, Josef, to Cassella Aktiengesellschaft. Water-soluble yellow monoazo dyestuffs. 4,881,977, Cl. 106-22.000.
Bausch, Paul, to General Motors Corporation. Flexible mounting for engines, machine assemblies and the like. 4,881,724, Cl. 267-64.230.
Bausch, Paul, to General Motors Corporation. Steerable front axle for motor vehicles. 4,881,749, Cl. 280-95.100.
Baxter International Inc.: *See—*
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Baxter, Steven L.: *See—*
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Baxter Travenol Laboratories, Inc.: *See—*
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Grogler, Gerhard; Ruckes, Andreas; Hess, Heinrich; and Kopp, Richard, 4,882,411, Cl. 528-54.000.
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BBC Brown Boveri AG: *See—*
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Beach, David: *See—*
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Beamer, Henry E.; and Buchanan, William J., to General Motors Corporation. Header plate for pressure vessels, heat exchangers and the like. 4,881,594, Cl. 165-173.000.
Beard, Terry D. Method and apparatus for high resolution analog-digital-analog transformations. 4,882,585, Cl. 341-143.000.
Bearden, Roby, Jr.: *See—*
Eidt, Clarence M., Jr.; Aldrige, Clyde L.; and Bearden, Roby, Jr., 4,882,036, Cl. 208-50.000.
Beck, Fritz: *See—*
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Becker, Frederick E.; and Smolensky, Leo A., to United States of America, Energy. Cyclone reactor with internal separation and axial recirculation. 4,881,476, Cl. 110-347.000.
Becker, Larry W., to General Chemical Corporation. Solid aluminum hydroxide compositions. 4,882,140, Cl. 423-629.000.
Beecham Group p.l.c.: *See—*
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Beeton, Thomas B.; Mostert, Roelof J.; Navarro, Emilia B.; Rosinger, Pierre R.; and Badenhorst, Rudolf P. Special rolled steels. 4,881,991, Cl. 148-325.000.
Beezer, Earl F.: *See—*
Beezer, William E.; and Beezer, Earl F., 4,881,356, Cl. 53-53.000.
Beezer, William E.; and Beezer, Earl F., to Stelron Components. Apparatus for assembling multi-part article. 4,881,356, Cl. 53-53.000.
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Beisswanger, Rudolf, to J.M. Voith GmbH. Unwinding apparatus for paper or board web rolls. 4,881,695, Cl. 242-58.400.
Bell, Andrew, to Hercules Incorporated. Slow gel/cure systems based on dialkylzinc for dicyclopentadiene polymerization. 4,882,401, Cl. 526-119.000.
Bell, Emmett L.: *See—*
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Bell Helicopter Textron Inc.: *See—*
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Bellotti, Marc; Lueders, Arthur; Granzow, Daniel B.; Taylor, Larry C.; and Nauman, Mark, to Baxter International Inc. Apparatus for ex-

changing and irradiating tubing connections. 4,882,496, Cl. 250-455.100.

Ben-David, David. Parked vehicle locating aid. 4,881,758, Cl. 283-102.000.

Bench, Thomas R.; and McCann, Larry D., to United States of America, Energy. Method and apparatus for the in situ decontamination of underground water with the aid of solar energy. 4,882,071, Cl. 210-747.000.

Beneke, Herbert; and Peter, Siegfried, to Rutgerswerke AG. Improved production of carbon fibers. 4,882,139, Cl. 423-447.400.

Bengtsson, Lars-Erik, to Stifab AB. System for controlling automatically the setting of a damper in a ventilation duct. 4,881,572, Cl. 137-488.000.

Bennett, Sanford M.: *See—*
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Benning, Gunter. Support section for mines and tunnels. 4,881,853, Cl. 405-288.000.

Benslow Incorporated: *See—*
Denslow, Jurnior J.; and Denslow, Ronald S., 4,881,514, Cl. 124-23.00R.

Berg, Anders, to Shampoo Sponge International B.V. Method of packaging articles of a compressible material. 4,881,358, Cl. 53-399.000.

Berg, Anette; and Hoffmann, Gunter, to Braun Aktiengesellschaft. Switch device for activating and deactivating an electrically operated driving member of an appliance. 4,882,458, Cl. 200-52.00R.

Berger, Frank: *See—*
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Bergeron, Daniel R.; and Dutton, Clifton C., to GTECH Corporation. On-line wagering system with programmable game entry cards and operator security cards. 4,882,473, Cl. 235-380.000.

Bergersen, Earl O. Muscular expansion bumper and head-gear appliance. 4,881,896, Cl. 433-5.000.

Bergh, Robert J., Jr.: *See—*
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Bergh, Robert J., Sr.; and Bergh, Robert J., Jr. Dispersal apparatus with rotation valving. 4,882,045, Cl. 210-86.000.

Berghaus, Rainer: *See—*
Saupe, Thomas; Klebe, Gerhard; Schirmer, Ulrich; Paul, Gerhard; Kober, Reiner; Wuerzer, Bruno; Berghaus, Rainer; Meyer, Norbert; and Westphalen, Karl-Otto, 4,881,969, Cl. 71-94.000.

Bergler, Otto, to Black & Decker Overseas AG. Bench type milling cutter. 4,881,585, Cl. 144-134.00A.

Bergman, Nils-Åke; Widell, Harald; and Widell, Jan. Conductor strip for electrical and telecommunication conductors. 4,881,907, Cl. 439-111.000.

Bergmann, Gyorgy; Csaba, Gabor; and Hivessy, Geza. Heat exchange pipe for heat transfer. 4,881,596, Cl. 165-174.000.

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Bernal, Medardo P. Chain tensioning device. 4,881,928, Cl. 474-111.000.

Berndorf Luzern AG: *See—*
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Bertrand Faure Automobile: *See—*
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Bessho, Yoshinori: *See—*
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Beyer, James D.; and Johnson, Mark E., to Wisconsin Milk Marketing Board. Method of manufacture of creamy Havarti style cheese. 4,882,179, Cl. 426-36.000.

BF Goodrich Company, The: *See—*
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Bhat, Deepak; and Shah, Dhirajlal, to GTE Valenite Corporation. Silicon nitride cutting tool. 4,881,950, Cl. 51-307.000.

Biazzi, Giuseppe: *See—*
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Biedermann, Robert E.; and Countryman, Albert J., to Esselte Pendaflex Corporation. Cutting apparatus for sheet material. 4,881,439, Cl. 83-879.000.

Bielomatik Leuze GmbH & Co.: *See—*
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Bieneck, Jurgen, to Fried. Krupp Geselischahft mit beschrankter Haftung. Method of making a sintered body having an internal channel. 4,881,431, Cl. 76-108.00R.

Bikson, Benjamin; Miller, James E.; and Nelson, Joyce K., to Union Carbide Corporation. Permeable membranes for enhanced gas separation. 4,881,954, Cl. 55-16.000.

Bikson, Benjamin; and Giglia, Slavatore, to Union Carbide Corporation. Method for gas separation using helically wound hollow fibers permeable membrane cartridge. 4,881,955, Cl. 55-16.000.

Bille, Josef F.; and Brown, Stuart I., to Intelligent Surgical Lasers. Imaging system for surgical lasers. 4,881,808, Cl. 351-221.000.

Billings, Wayne E.; Phillips, Robert F.; and Gantzhorn, John E., Jr., to Otari Electric Company, Ltd. High speed contact printing process for prerecorded magnetic tape. 4,882,636, Cl. 360-16.000.

Binzer, Norbert: *See—*
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Bio-Medical Research Laboratories, Inc.: *See—*
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Biomass Development Europe SA: *See—*
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Black & Decker, Inc.: *See—*
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Black & Decker Overseas AG: *See—*
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Blackborow, Richard J.: *See—*
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Blackman, Gordon R., to Whirlpool Corporation. Hose assembly for canister vacuum cleaner. 4,881,909, Cl. 439-191.000.

Blaise, Petrin: *See—*
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Blanchard, Russell O., to Batts, Inc. Information display means for garment hanger hooks. 4,881,836, Cl. 40-322.000.

Blank, Eric; and Endelson, Robert A. Dispenser for dental floss. 4,881,560, Cl. 132-324.000.

Blaschke, Gottfried; Fraenkel, Werner; Broker, Werner; and Kinkel, Joachim, to Merck Patent Gesellschaft Mit Beschrankter Haftung. Optically active adsorbents. 4,882,048, Cl. 210-198.200.

Blatt, Eli. Method and apparatus for manufacturing plastic film bag with special flap arrangement. 4,881,932, Cl. 493-213.000.

Blech, Ilan A.; Gerzberg, Levy; Shacham, Yosef Y.; Sinar, Alexander; and Sirkin, Eric R., to Zoran Corporation. Double layer voltage-programmable device and method of manufacturing same. 4,882,611, Cl. 357-51.000.

Blees, Frederik C., to Deltracon Deventer B.V. Method and apparatus for preparing concrete mortar. 4,881,819, Cl. 366-8.000.

Blickenderfer, Charles: *See—*
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Block, Gordon S., to C. Hager & Sons Hinge Manufacturing Company. Door and method of fabricating the same. 4,881,346, Cl. 49-501.000.

Blom, Kari B., to Parkson Corporation. Method and apparatus for removing liquid from suspensions. 4,882,068, Cl. 210-703.000.

Blossfeld, Lothar, to Deutsche ITT Industries GmbH. Method of making a self-aligned silicide contact using polysilicon electrode as an etch mask. 4,882,297, Cl. 437-200.000.

Blum, Rainer, to BASF Aktiengesellschaft. One-component polyurethane systems containing viscosity-regulating substances. 4,882,408, Cl. 528-49.000.

Boatner Bruce E.: *See—*
Faulkerson, James L.; Picard, Raymond L.; Menard, Edward J.; Bennett, Sanford M.; McCarthy, Timothy J.; Foden, Edwin S.; Gipe, Michael A.; Moluf, Allan A.; Jacobs, Michael W.; and Boatner Bruce E., 4,882,629, Cl. 358-464.000.

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Bocharov, Jury A.; Safonov, Anatoly V.; Nosov, Anatoly P.; Tamaris, Jury I.; Lunkov, Evgeny S.; Myakinenkov, Vladimir I.; Perepechin, Igor Y.; Rudman, Leonid L.; Salov, Viktor P.; Bovykin, Igor V.; and Zaidlin, Mark M., to Moskovskoe Vyschee tekhnicheskoe uchilische imeni N.E.Baumana; and Experimentalny nauchno-issledovatelsky institut kuznechno-pressovogo mashinostroenia "ENIKMASH". Double-action screw press. 4,881,399, Cl. 72-454.000.

Bock, Jan: *See—*
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Boebel, Manfred; and Hiltebrandt, Siegfried, to Richard Wolf, GmbH. Instsrument for guiding a laser light transmitting fiber. 4,881,524, Cl. 128-6.000.

Boehringer Mannheim GmbH: *See—*
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Boeing Company, The: *See—*
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Harris, William G.; and Silva, Douglas J., 4,882,240, Cl. 429-17.000.
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Bogart, Larry; Hipkins, James J.; and Smith, Morris L., to Scott Paper Company. Chemically treated paper products - towel and tissue. 4,882,221, Cl. 428-308.800.

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Bohacek, Jan, to Jani-Jack Limited. Mops and mop frames. 4,881,290, Cl. 15-228.000.

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McCombie, Stuart W.; Kirkup, Michael P.; and Boland, Amy Sommese, 4,882,429, Cl. 540-357.000.

Bolt, Anthony J. N.; and Sadd, John S., to Imperial Tobacco Limited. Smoking articles. 4,881,555, Cl. 131-335.000.

Bomgaars, Roger: *See*—
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Bone, Matthew F.: *See*—
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Bonnefoy-Claudet, Jean-Paul; and Mestais, Corinne, to Commissariat a L'Energie Atomique. Process and device for taking into account locating pulses supplied by a gamma camera. 4,882,680, Cl. 364-413.240.

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Bonser, John R., to RJF International Corporation. Novel flexible magnet for use in small dc motors. 4,881,988, Cl. 148-300.000.

Bordignon, Abramo, to A.T.B. S.p.A. Mask structure for cassettes of magnetic tape. 4,882,645, Cl. 360-132.000.

Borger, James H.: *See*—
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Borig, Donald A.; Harris, Godfrey; and Korngold, Gary P. Orthopedic hip hinge providing adjustment for abduction. 4,881,532, Cl. 128-80.00A.

Borlinghaus, Hans J.; and Orlowsky, Michael G., to General Motors Corporation. Restraint belt load capacity fore and aft power seat adjuster apparatus and method. 4,881,781, Cl. 297-473.000.

Borlinghaus, Hans J.; Orlowsky, Michael G.; Goodbred, Neil G.; Humer, Mladen; and Cooper, Steven J., to General Motors Corporation. Apparatus and method of anti-ratcheting vehicle seat adjuster slide. 4,881,827, Cl. 384-47.000.

Born, Maurice; Lallement, Jacques; Marchand, Pierre; Parc, Guy; and Thevenin, Nicole, to Institut Francais Du Petrole. Metal dihydrocarbyl-dithiophosphyl-dithiophosphates their manufacture and use as additives for lubricants. 4,882,446, Cl. 556-25.000.

Borst, Nico; Talbot, Marc D.; and Scott, James D., to Kidd Creek Mines Ltd. Cathode hangers. 4,882,027, Cl. 204-286.000.

Bortolin, Roberto, to Dow Corning Limited. Polysilanes. 4,882,450, Cl. 556-430.000.

Bosch-Siemens Hausgerate GmbH: *See*—
Husslein, Julius; Hess, Helmut; and Beifuss, Wolfgang, 4,882,462, Cl. 219-10.55B.

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Bosl, George F.; Kelly, Patrick M.; Alvarez, Dennis A.; Sauer, Gale; and Hocevar, Joseph A., to USG Interiors, Inc. Cold roll-formed structures and method and apparatus for producing same. 4,881,355, Cl. 52-738.000.

Bottenbruch, Ludwig: *See*—
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Bouchon, Jean C. M., to La Physique Appliquee Industrie. Four electrique notamment pour traitement thermique. 4,882,468, Cl. 219-400.000.

Bovet, Christian, to Essilor International Cie Generale d'Optique. Automatic interpupillary distance measuring device. 4,881,806, Cl. 351-204.000.

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Bowe, Gerald J., to JBI Corporation. Pressure activated fluid retaining system and method. 4,881,854, Cl. 405-303.000.

Bowman, Jeffrey M. Gate valve. 4,881,719, Cl. 251-328.000.

Boyd, Monty. Remote combustible gas sensor. 4,882,576, Cl. 340-632.000.

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BP Chemicals Limited: *See*—
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Bracht, Roger R.; and Verboom, Johannes J., to Laser Magnetic Storage International Company. Offset for protection against amorphous pips. 4,882,721, Cl. 369-54.000.

Bradley, David W.; Melotti, Angelo R.; Lecere, Oliver; and Bonnici, Gerald P., to Bertrand Faure Automobile. Memory seat track assembly for vehicle seat. 4,881,774, Cl. 297-341.000.

Braendel & Associates, Inc.: *See*—
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Braendel, Gregory G.; Goodwin, David M.; and Moore, Brian J., to Braendel & Associates, Inc. Cubicle. 4,881,353, Cl. 52-239.000.

Braginsky, Sidney, to Primary Systems Corporation. Apparatus for inspecting wafers. 4,881,863, Cl. 414-225.000.

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Braverman, Melvin; and Lazar, Joseph, to Jefferson International. Display device. 4,881,336, Cl. 40-530.000.

Breitman, Theodore: *See*—
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Breitscheidel, Hans-Ulrich; Kautz, Rudolf; and Sandermann, Karl-Heinz, to Huels Troisdorf AG; and Balsam Sportstattenbau & Co. KG. Multilayer composite sheet, especially for use as a padding layer under artificial grass. 4,882,208, Cl. 428-17.000.

Brengauz, Alexander: *See*—
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Brett, Jame F.: *See*—
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Brewer, Earl G.; Lee, Robert W.; and Croat, John J., to General Motors Corporation. Method for producing anisotropic RE-FE-B type magnetically aligned material. 4,881,985, Cl. 148-103.000.

Brierley, David; Kenyon, Ronald W.; and Ridyard, Denis R. A., to Imperial Chemical Industries PLC. Disperse dyes: nitro-thiophene azo dyes for bright blue shades on polyester. 4,881,943, Cl. 8-662.000.

Brindopke, Gerhard; and Honel, Michael, to Hoechst AG. Polymers containing amino groups, their preparation and their use. 4,882,391, Cl. 525-327.200.

Bristol-Myers Company: *See*—
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Britax Rainsfords Pty. Ltd.: *See*—
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British Aerospace PLC: *See*—
Adkins, Richard C., 4,881,875, Cl. 417-54.000.

British Telecommunications, plc: *See*—
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British Telecommunications Public Limited Company: *See*—
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Broadwin, Alan: *See*—
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Broker, Werner: *See*—
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Brooklyn Union Gas: *See*—
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Brotz, Gregory R. Remote language translating device. 4,882,681, Cl. 364-419.000.

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Brown, Arthur C. Window bird feeder. 4,881,491, Cl. 119-51.010.

Brown, Kevin J., to U.S. Philips Corporation. Multileaf collimator and related apparatus. 4,882,741, Cl. 378-152.000.

Brown, Maurice H. Terminal inserting apparatus. 4,881,317, Cl. 29-739.000.

Brown, Morrie. Viewer. 4,881,334, Cl. 40-365.000.

Brown, Mortimer; and Hellwig, John, to Teknion Furniture Systems Inc. Panel locking system. 4,881,349, Cl. 52-127.110.

Brown, Robert J.: *See*—
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Brungel, Norbert; and Schumacher, Hermann-Josef, to Rheinische Braunkohlenwerke AG. Method of starting a gasifier. 4,881,949, Cl. 48-197.00R.

Bruning, Gert W.; and Stupp, Edward H., to North American Philips Corporation. High frequency high voltage power supply with controlled output power. 4,882,666, Cl. 363-97.000.

Brunst, Gerhard: *See*—
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Brynsvold, Glen V.; Lopez, John T.; Olich, Eugene E.; and West, Calvin W., to General Electric Company. Submersible sodium pump. 4,882,514, Cl. 310-208.000.

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Buchan, Stuart H.; Ehrlich, Robert; Trygstad, Joyce C.; and Wardlaw, Norman C., to Standard Oil Company, The. Method of making a rock-pore micromodel involving generation of an accurate and reliable template image of an actual reservoir rock pore system. 4,882,763, Cl. 382-1.000.

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Buckholz, Lawrence; Byrne, Brian; and Sudol, Marion; to International Flavors & Fragrances Inc.. Process for microwave browning and product produced thereby. 4,882,184, Cl. 426-243.000.

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Bugg, Brian J.; Martin, Glenn E.; Oberg, David J.; and Ticu, Adriana E., to BASF Corporation. Sealant primer composition and method. 4,882,003, Cl. 156-315.000.

Bugnet, Bernard; and Doniat, Denis, to Sorapec Societe de Researche et d'Applications Electrtochimiques. Porous metal structure and method of manufacturing of said structure. 4,882,232, Cl. 428-613.000.

Bullard, Gary M. Combination automobile and airplane. 4,881,701, Cl. 244-49.000.

Bunel, Gerard; Charquet, Daniel; and Dombre, Max, to Compagnie Europeenne Du Zirconium Cezus. Zircaloy 2 or Zircaloy 4 strip having specified tensile and elastic properties. 4,881,992, Cl. 148-421.000.

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Bustamante, Carlos; Husher, Frederick K.; and Beach, David, to University of New Mexico, The. Differential imaging device. 4,881,818, Cl. 356-367.000.

Butikofer, Jurg; and Meyer, Hans, to BBC Brown Boveri AG. Steam turbine for part load operation. 4,881,872, Cl. 415-143.000.

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Buzas, Andre ; and Ollivier, Roland, to Les Laboratoires Meram. 1-[(1,1-diphenyl)-1-alkenyl]piperazine derivatives, method of preparation and pharmaceutical compositions in which they are present. 4,882,331, Cl. 514-255.000.

B.V. Aannemingsbedriof N.B.M.: *See*—
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Cannon Kabushiki Kaisha: *See*—
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Dietrich, Horst: *See*—
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Dietrich, Markus; and Berger, Frank, to Mercedes-Benz AG. Hydraulic play compensating element. 4,881,499, Cl. 123-90.520.
Dietz, Erwin; and Prokschy, Frank, to Hoechst Aktiengesellschaft. Pigments of the quinacridonequinone series, processes for their preparation and their use. 4,881,980, Cl. 106-495.000.
Digideck, Inc.: *See*—
Weaver, Charles S.; Chittenden, Constance T.; and Conner, Allen B., Jr., 4,882,754, Cl. 381-35.000.
Digital Recording Research Limited Partnership: *See*—
Weaver, Charles S.; Chittenden, Constance T.; and Conner, Allen B., Jr., 4,882,754, Cl. 381-35.000.
Dimick, Keene P. Electric warm air mirror defogging device. 4,882,467, Cl. 219-219.000.
Dimitri, Kamal E.; Hassner, Martin A.; and Siegel, Paul H., to International Business Machines Corporation. Modified sliding block code for limiting error propagation. 4,882,583, Cl. 341-59.000.
Dingler, Gerhard. Assembly for prefabricated formwork. 4,881,716, Cl. 249-192.000.
Dixon, David R.; and Anderson, Nevil J., to Commonwealth Scientific and Research Organization. Method of removing impurities from hard waters or waters with significant calcium/magnesium concentrations. 4,882,064, Cl. 210-667.000.
Dixon, Michael W., to Sandoz Ltd. Suppress dyeing method. 4,881,941, Cl. 8-482.000.
Dlugokecki, Andrew N., to Parker Hannifin Corporation. Drain for internal gear hydraulic device. 4,881,880, Cl. 418-61.300.
Dobrowsky, Josef, to Cincinnati Milacron, Inc. Method of controlling the thickness of an extruded plastic article. 4,882,104, Cl. 264-40.100.
Dobson, Brian; Whyman, Peter J. M.; Doy, Ralph J.; Engel, Manfred O.; and Davies, Raymond, to Imperial Chemical Industries PLC. Chemical reactor and process. 4,882,444, Cl. 549-534.000.
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Doi, Makoto; Nakajima, Hiroyukio; Miyamoto, Fumiyuki; Oka, Seiji; and Nonogaki, Mitsuhiro, to Mitsubishi Denki Kabushiki Kaisha. Electrical insulating resin. 4,882,389, Cl. 525-310.000.
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Demler, Henry W., Jr.; Dola, Frank P.; Kimmel, David J.; Lauterbach, John H.; Sotolongo, Thomas J.; and Zwieg, Grover A., 4,881,905, Cl. 439-79.000.
Dolph, Darrel A.; Demski, Leonard W.; Taylor, Robert E.; and Loisel, Jean-Marie, to Nartron Corporation. Analog-to-digital converter. 4,882,586, Cl. 341-169.000.
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Domenick, Robert; Foreman, Phillip; Parish, David M.; and Pettibone, Donald W., to Resonex, Inc. Magnetic resonance imaging (MRI)apparatus with quadrature radio frequency (RF) coils. 4,882,540, Cl. 324-318.000.
Donahue, Francis M.; Simonsen, Leif R.; and Moy, Russell L., to University of Michigan-Ann Arbor, The. Battery containing a metal anode and an electrolyte providing high rates of metal electrolysis at near ambient temperatures. 4,882,244, Cl. 429-194.000.
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Dorshimer, Glena E., to General Motors Corporation. Apparatus and method of utilization thereof of a profile headrest. 4,881,777, Cl. 297-406.000.

Dosapro Milton Roy: *See—*
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Maxson, Myron T., 4,882,369, Cl. 523-213.000.
Mbah, Godfrey C., 4,882,398, Cl. 525-478.000.
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Duetsche Gesellschaft fur Wiederaufarbeitung von Kernbrenstoffen mgH: *See—*
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Dumain, Andre; and Raufast, Charles, to BP Chemicals Limited. Process for gas phase polymerization of olefins in a fluidized bed reactor. 4,882,400, Cl. 526-88.000.
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Du Pont de Nemours, E. I., and Company: *See—*
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Durda, Joseph A.; and Giese, Thomas G., to Aeration Industries, Inc. Aeration apparatus havine a deicing mechanism and control circuit therefor. 4,882,099, Cl. 261-128.000.
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Dziondziak, Klaus, to Holsten-Brauerei AG. Method for the production of alcohol-free beer. 4,882,177, Cl. 426-14.000.
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E.I. Du Pont De Nemours and Company: *See—*
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Weaver, Max A.; Coates, Clarence A., Jr.; Pruett, Wayne P.; and Hilbert, Samuel D., 4,882,412, Cl. 528-190.000.
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Eidenschink, Rudolf; Krause, Joachim; Hittich, Reinhard; Poetsch, Eike; Scheuble, Bernhard; Weber, Georg; and Pohl, Ludwig, to Merck Patent Gesellschaft Mit Beschrankter Haftung. Nitrogen-containing hetercyclic compounds. 4,882,082, Cl. 252-299.610.
Eidt, Clarence M., Jr.; Aldrige, Clyde L.; and Bearden, Roby, Jr., to Exxon Research and Engineering Company. Combination coking and hydroconversion process. 4,882,036, Cl. 208-50.000.
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Shih, Chuan; and Taylor, Edward C., 4,882,334, Cl. 514-258.000.
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Ellis, John L. Lottery ticket scraper enabling precise removal of surface layer from ticket. 4,881,291, Cl. 15-236.010.
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Enokida, Toshio; and Takano, Shigemasa, to Toyo Ink Manufacturing Co., Ltd. Titanium phthalocyanine optical semiconductor material and electrophotographic plate using same. 4,882,427, Cl. 540-141.000.
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Fantacci, Tosco, to CISAP S.p.A. Equipment for automating the distribution of preparatory solution used in the recapping of tire treads. 4,881,488, Cl. 118-320.000.
Fantacci, Tosco, to CISAP S.p.A. Handling device for tires to be remolded on vulcanization presses with selection from different stocks of tires. 4,881,882, Cl. 425-38.000.
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Sogabe, Masatoyo; Okuda, Kanemasa; Sakamoto, Keiji; and Matsubara, Shunsuke, 4,882,528, Cl. 318-600.000.
Fanuc Ltd: *See*—
Obara, Haruki, 4,882,464, Cl. 219-69.130.
Farah, Khaled S. Combination package for disinfecting and covering toilet seat. 4,881,278, Cl. 4-243.000.
Faraone, Alexander. Radially arcuated speaker cone. 4,881,617, Cl. 181-164.000.
Fariabi, Sepehr: *See*—
Thoma, Paul E.; AbuJodom, David N., II; and Fariabi, Sepehr, 4,881,981, Cl. 148-11.50R.
Farley, Doyle J.: *See*—
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Farmitalia Carlo Erba, S.r.l.: *See*—
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Farmitalia Carlo Erba S.p.A.: *See*—
Chiodini, Laura; Gobbini, Mauro; Mantegani, Sergio; Ruggieri, Daniel; Temperilli, Aldemio; Traquandi, Gabriella; and Ferrari, Patrizia, 4,882,315, Cl. 514-26.000.
Farnham, Gil: *See*—
Chapin, David S.; Farnham, Gil; and Burgin, Al, 4,881,894, Cl. 431-255.000.
Farrell, Robert C.; and Lundy, George A., to General Motors Corporation. Wheel bearing assembly. 4,881,842, Cl. 403-19.000.

Farris, Robert R.: *See*—
Purcell, Robert J.; and Farris, Robert R., 4,881,609, Cl. 180-9.500.
Fasen, Kenneth: *See*—
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Faulkerson, James L.; Picard, Raymond L.; Menard, Edward J.; Bennett, Sanford M.; McCarthy, Timothy J.; Foden, Edwin S.; Gipe, Michael A.; Moluf, Allan A.; Jacobs, Michael W.; and Boatner Bruce E., to Everex Ti Corporation. Adaptive exposure control system. 4,882,629, Cl. 358-464.000.
Faust, William D.: *See*—
Gettys, James R.; Johnson, Gordon H.; Demiray, Temel; and Faust, William D., 4,882,301, Cl. 501-17.000.
Feinberg, Lee N. Rear-window wind deflector for a vehicle. 4,881,772, Cl. 296-180.100.
Feinberg, Vera L. Ornamental vehicle identification device. 4,881,485, Cl. 116-28.00R.
Feinwerktechnik Schleicher & Co.: *See*—
Goldhammer, Albert; Schleicher, Hans; Stangenberg, Hartmut; and Gasteier, Rolf, 4,881,692, Cl. 241-167.000.
Feldman, Ellis S.: *See*—
Huss, Ronald E.; and Feldman, Ellis S., 4,882,590, Cl. 342-453.000.
Feldmeier, Fritz, to GMN Georg Muller Nurnberg AG. Apparatus for manufacturing and handling thin wafers. 4,881,518, Cl. 125-14.000.
Felthuis, Jacob; and Stokman, Ronald J. M., to Hoogovens Groep B.V. Ceramic gas burner for a combustion chamber of a hot-blast stove. 4,881,895, Cl. 432-181.000.
Feltz, Kristi T.: *See*—
Miller, Phillip; Shindley, Richard P.; Feltz, Kristi T.; Hanson, George E.; and White, Jonathan R., 4,882,475, Cl. 235-383.000.
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Olson, Roland F.; and Fergle, Richard R., 4,882,190, Cl. 426-541.000.
Ferguson, George W. Plant support device and display stand therefor. 4,881,342, Cl. 47-47.000.
Ferrari, Patrizia: *See*—
Chiodini, Laura; Gobbini, Mauro; Mantegani, Sergio; Ruggieri, Daniel; Temperilli, Aldemio; Traquandi, Gabriella; and Ferrari, Patrizia, 4,882,315, Cl. 514-26.000.
Ferri, Joseph E. Porous filter media support plate. 4,882,053, Cl. 210-293.000.
Ferro, Alberto; and Steffen, Hans, to Hoffmann-La Roche Inc. Parenteral micelle solutions. 4,882,164, Cl. 424-450.000.
Ferro Corporation: *See*—
Gettys, James R.; Johnson, Gordon H.; Demiray, Temel; and Faust, William D., 4,882,301, Cl. 501-17.000.
Ferti, Corrado: *See*—
Cozzi, Paolo; Ferti, Corrado; Salvati, Patricia; Carganico, Germano; and Pillan, Antonio, 4,882,347, Cl. 514-396.000.
Fetterman, Thomas. Crutch tip. 4,881,564, Cl. 135-82.000.
Fey, Edward G.: *See*—
Penman, Sheldon; and Fey, Edward G., 4,882,268, Cl. 435-5.000.
Fiberglas Canada Inc.: *See*—
Kyle, Teresa M.; Meunier, Paul J.; and MacPherson, Edwin J., 4,882,364, Cl. 521-136.000.
Ficker, Harold K.; and Sheard, William G., to Union Carbide Chemicals and Plastics Company Inc. Process for the production of impact polypropylene copolymers. 4,882,380, Cl. 525-53.000.
Fiedler, Volker-Bernd: *See*—
Niewohner, Ulrich; Hoever, Franz-Peter; Lieb, Folker; Oediger, Hermann; Rosentreter, Ulrich; Boshagen, Horst; Perzborn, Elisabeth; Fiedler, Volker-Bernd; and Seuter, Friedel, 4,882,353, Cl. 514-456.000.
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Hoferer, Richard; Klotz, Arthur; Lehmann, Volker; and Trumpfheller, Gunter, 4,881,292, Cl. 16-2.000.
Fimeri, Garry G., to Britax Rainsfords Pty. Ltd. Pivotable screw jack drive. 4,881,418, Cl. 74-89.140.
Finisar Corporation: *See*—
Levinson, Frank H., 4,881,789, Cl. 350-96.150.
Finn, Jerome W.; Montgomery, Robert L.; and Schuchard, Frank B., to Ideal Industries, Inc. Machine and method for making screw-on connectors. 4,881,322, Cl. 29-878.000.
Fiorenzo, William S. Scent head arrow. 4,881,743, Cl. 273-418.000.
Fischer, Albrecht: *See*—
Schubert, Erdmann; Ploog, Klaus; Fischer, Albrecht; and Horikoshi, Yoshiji, 4,882,609, Cl. 357-22.000.
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Hafner, Josef; Bergmeier, Werner; Schonenberger, Rolf; and Fischer, Matthias, 4,881,468, Cl. 104-103.000.
Fisher, William M.; McMahan, Michael L.; Doddington, George; and Bocchieri, Enrico L., to Texas Instruments Incorporated. Speech recognition system. 4,882,757, Cl. 381-43.000.
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Menendez, Rogelio; and Gorelick, Kenneth J., 4,882,170, Cl. 424-600.000.
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Flanigan, Virgil J.: *See*—
Parker, Thomas H.; and Flanigan, Virgil J., 4,881,947, Cl. 48-89.000.
Flanigen, Edith M.: *See*—
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Flatman, Richard J., to Rolls-Royce PLC. Gas turbine engine. 4,881,367, Cl. 60-39.070.
Fling, Russell T.; and Willis, Donald H., to RCA Licensing Corporation. Signal combining circuitry. 4,882,626, Cl. 358-166.000.
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Taeusch, H. William; Jacobs, Kenneth A.; Steinbrink, D. Randall; Floros, Joanna; Phelps, David S.; and Fritsch, Edward F., 4,882,422, Cl. 530-350.000.
Floyd, Terry S.: *See*—
Neas, Edwin D.; and Floyd, Terry S., 4,882,286, Cl. 436-175.000.
Fluhs Drehtechnik GmbH: *See*—
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Flygare, Wayne A.; Olson, Raymond N.; Reynolds, Richard W.; and Aleem, Mohd A., to Sundstrand Corporation. Dual permanent magnet generator. 4,882,513, Cl. 310-114.000.
Foden, Edwin S.: *See*—
Faulkerson, James L.; Picard, Raymond L.; Menard, Edward J.; Bennett, Sanford M.; McCarthy, Timothy J.; Foden, Edwin S.; Gipe, Michael A.; Moluf, Allan A.; Jacobs, Michael W.; and Boatner Bruce E., 4,882,629, Cl. 358-464.000.
Folkesson, Bo. Press for the continuous production of boards. 4,881,888, Cl. 425-371.000.
Ford Aerospace Corporation: *See*—
Michika, David; and Brown, Robert J., 4,881,796, Cl. 350-166.000.
Tanner, Robert M., 4,882,733, Cl. 371-43.000.
Ford, Colin P.: *See*—
Harston, John C.; and Ford, Colin P., 4,881,934, Cl. 493-315.000.
Ford Motor Company: *See*—
Yopp, W. Trent, 4,882,693, Cl. 364-424.010.
Foreman, Phillip: *See*—
Domenick, Robert; Foreman, Phillip; Parish, David M.; and Pettibone, Donald W., 4,882,540, Cl. 324-318.000.
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Forgione, Peter S.: *See*—
Balwant, Singh; and Forgione, Peter S., 4,882,385, Cl. 525-123.000.
Formatec Tooling Systems, Inc.: *See*—
Stewart, Harry D.; and Stodd, Ralph P., 4,881,397, Cl. 72-361.000.
Forster, Jurgen; and Bramer, Manfred, to Duetsche Gesellschaft fur Wiederaufarbeitung von Kernbrenstoffen mgH. Remote manipulable device for establishing a transport connection with a remote manipulable tool. 4,881,433, Cl. 81-55.000.
Forsythe, John: *See*—
Hoffine, Harold C.; Forsythe, John; and Morgan, Leon, 4,881,849, Cl. 405-128.000.
Fory, Werner; and Meyer, Willy, to Ciba-Geigy Corporation. N-heterocyclosulfonyl-N'-pyrimidinylureas. 4,881,964, Cl. 71-91.000.
Foster, L. Dale: *See*—
Koerber, Clement J., Sr.; Gallant, Dennis J.; and Foster, L. Dale, 4,882,566, Cl. 340-825.690.
Foster-Miller, Inc.: *See*—
Rubin, Leslie S.; and Hug, Hans A., 4,882,094, Cl. 252-633.000.
Four Nines, Inc.: *See*—
Santoleri, Joseph J.; and Ross, Richard D., 4,882,009, Cl. 159-4.200.
Fournier, Paul J. E.; Kulikowski, Ernest F.; and Allread, Alan R., to Aeroquip Corporation. Self-aligning coupling. 4,881,569, Cl. 137-360.000.
Fox, Daniel W. Bat handle for plastic beverage bottle. 4,881,736, Cl. 273-26.00B.
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Blaschke, Gottfried; Fraenkel, Werner; Broker, Werner; and Kinkel, Joachim, 4,882,048, Cl. 210-198.200.
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Franco, Zadson d. A.; and Barreto, Demostenis A. W., to Petroleo Brasileiro S.A. - Petrobras. Mechanical system for diversion in the acidizing treatment of oil formations. 4,881,599, Cl. 166-284.000.
Franek, Henning; Deutscher, Klaus-Konrad, deceased (by Deutscher, Anneliese, executor); Broemer, Heinz; Strunz, Volker; and Rosenkranz, Wolfgang, to Ernst Leitz Wetzlar GmbH. Tooth-root implant with long-term resistance to repetitive stresses. 4,881,897, Cl. 433-169.000.
Frank, Larry A.: *See*—
Pielet, Howard M.; Frank, Larry A.; Edgar, William; and Alavanja, Milan, 4,881,990, Cl. 148-320.000.
Frank, Tibor: *See*—
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Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H.: *See*—
Theurer, Josef, 4,881,467, Cl. 104-7.200.
Franzen, Jochen; Gabling, Reemt-Holger; Heinen, Gerhard; and Weiss, Gerhard, to United States of America, Army. Method of mass analyzing a sample by use of a quistor. 4,882,484, Cl. 250-282.000.
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Freeland, Dwain: *See*—
Stromberger, Thomas; Freeland, Douglas; and Freeland, Dwain, 4,881,472, Cl. 110-186.000.

Freeman, Dean W.; and Burris, James B., to Texas Instruments Incorporated. Deposition of polysilicon using a remote plasma and in situ generation of UV light. 4,882,299, Cl. 437-233.000.

Freermann, Johannes, to Carl Schmale GmbH & Co. KG. Method of transversely subdividing an elongated flexible web. 4,881,479, Cl. 112-262.300.

Freissle, Manfred F. A., to Polydeck Screen Corporation. Screening arrangement. 4,882,044, Cl. 209-319.000.

Frey, Gunter; and Wagner, Rudolf, to Carl Freudenberg, Firma. Sleeve for plant germination substrate. 4,881,344, Cl. 47-77.000.

Fried. Krupp Gesellscahft mit beschrankter Haftung: *See*—
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Friedrich Mortl Schleppergerate Bau GMBH & Co. KG.: *See*—
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Friel, Kevin J., to Raychem Corporation. Electrical devices comprising conductive polymers. 4,882,466, Cl. 219-219.000.

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Fritz Bauer + Sohne oHG: *See*—
Bauer, Hans J.; Bauer, Hans-Peter; and Stadelmann, Ludwig, 4,881,723, Cl. 267-64.120.

Fuchs, Charles R.; Haessig, David A., Jr.; Heckathorn, David L.; Kass, Jordan S.; Lindsay, Peter; and Volpe, Joseph J., to Plessey Electronic Systems Corp. Two-axis mirror stabilization assembly. 4,881,800, Cl. 350-500.000.

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Fuji Electric Co., Ltd.: *See*—
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Fuji Jukogyo Kabushiki Kaisha: *See*—
Etoh, Motoaki; and Ishii, Keisuke, 4,881,510, Cl. 123-572.000.
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Fuji Oil Company, Limited: *See*—
Maeda, Hirokazu; Yamaguchi, Mayumi; Uchiyama, Tetsuya; Baba, Hideki; Matsunami, Hidenobu; Ebihara, Yoshitaka; and Kanegae, Junji, 4,882,192, Cl. 426-607.000.

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Fuji Photo Film Co., Ltd.: *See*—
Ikeda, Kenji; Iwakura, Ken; and Takashima, Masanobu, 4,882,311, Cl. 503-208.000.
Kawagishi, Toshio; and Nakazyo, Kiyoshi, 4,882,266, Cl. 430-546.000.
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Takasaki, Yoshimi; Yamaguchi, Akira; and Yoshimura, Ryoichi, 4,882,490, Cl. 250-236.000.
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Fuji Xerox Co., Ltd.: *See*—
Marugama, Kazuo; Horie, Kiyoshi; Noami, Tsuneo; Yamamoto, Toshiro; Adachi, Koji; Okamoto, Toru; Sumikawa, Takeshi; and Nobumasa, Furuya, 4,882,247, Cl. 430-45.000.
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Fujii, Hiroshi; Iio, Tsukasa; Genba, Yasusi; Moriwaki, Hideaki; and Mochizuki, Yoshinori, to Mitsubishi Denki Kabushiki Kaisha. Multipole circuit interrupter. 4,882,556, Cl. 335-8.000.

Fujioka, Akio, to Kitagawa Industries Co., Ltd. Electric noise absorber. 4,882,561, Cl. 336-65.000.

Fujisaki, Hirotaka: *See*—
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Fujita, Hisashi: *See*—
Yagi, Hiroshi; Fujita, Hisashi; Harada, Yoshio; and Takahashi, Kenichi, 4,881,319, Cl. 29-840.000.

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Fujitsu Limited: *See*—
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Koshizuka, Atsuo, 4,882,534, Cl. 323-351.000.
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Fujitsu VLSI Limited: *See*—
Ohno, Chikai; and Hirata, Michiyuki, 4,882,712, Cl. 365-206.000.

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Fukuda, Kenji: *See*—
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Fukuda, Yoshihide: *See*—
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Fukui, Hiroshi; Namba, Ryujiro; Saito, Tsutomu; Ohtsu, Yutaka; Kimura, Asa; Nakano, Motokiyo; Nakata, Okitsugu; Tommita, Kenichi; Tokubo, Kazuo; Ohno, Kazuhisa; Yoneyama, Toshio; Ogawa, Takashi; Morohoshi, Hideo; Koyama, Junichi; Kanda, Taketoshi; Kawaguchi, Kunihiro; and Shimizu, Yuzo, to Shiseido Company Ltd. Modified powder or particulate material. 4,882,225, Cl. 428-405.000.

Fukunaga, Kenichi: *See*—
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Fukuyama, Masahiro: *See*—
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Fukuzawa, Takashi: *See*—
Sonobe, Kozo; Fukuzawa, Takashi; Takeuchi, Kohsuke; Tabata, Tatushi; Fukuoka, Hiroshi; Hisamatsu, Kunio; and Katamura, Makoto, 4,882,303, Cl. 501-28.000.

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Furbringer, Claude; and Pauling, Horst, to Hoffman-LA Roche Inc. Explosive and propellant composition and method of preparation. 4,881,993, Cl. 149-46.000.

Furin, Olivia P.: *See*—
Clearman, Jack F.; Furin, Olivia P.; Chiou, Joseph J.; and Squires, William C., 4,881,556, Cl. 131-359.000.

Furman, Anatol, to International Business Machines Corporation. Fully synchronous half-frequency clock generator. 4,882,505, Cl. 307-269.000.

Furukawa, Kenji: *See*—
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Terashima, Kanetsugu; Ichihashi, Mitsuyoshi; Kikuchi, Makoto; Takeshita, Fusayuki; and Furukawa, Kenji, 4,882,086, Cl. 252-299.610.

Furukawa, Osamu; Harata, Mitsuo; Yasumoto, Takaaki; and Imai, Motomasa, to Kabushiki Kaisha Toshiba. High dielectric constant type ceramic composition. 4,882,652, Cl. 361-321.000.

Furukawa, Yoshimi: *See*—
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Hattori, Yoshimasa; and Furusho, Noboru, 4,882,255, Cl. 430-73.000.

Furuya, Nagakazu, to Furuya, Nagakazu; and Tanaka Kikinzoku Kogyo K.K. Gas sensor. 4,882,031, Cl. 204-415.000.

Furuya, Yonezou: *See*—
Kobayashi, Osamu; Sugimoto, Osamu; Furuya, Yonezou; Ishida, Takeshi; Tanaka, Masanori; and Ishii, Jun, 4,881,630, Cl. 194-203.000.

Fuse, Toshikazu: *See*—
Ono, Akira; Fuse, Toshikazu; Miyamoto, Osamu; Makino, Shoso; Yamato, Yoshihisa; Kametani, Hiroshi; Tokura, Susumu; Tanaka, Hiromi; Ito, Toru; Nakao, Hitomi; Tokuoka, Shuji; and Takeda, Toshihide, 4,882,220, Cl. 428-240.000.

Fushimi, Takehiko: *See*—
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Futamura, Mitsushi: *See*—
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G. D. Searle & Co.: *See*—
Cordi, Alex A.; and Gorissen, Hugo J., 4,882,343, Cl. 514-341.000.

Gabling, Reemt-Holger: *See*—
Franzen, Jochen; Gabling, Reemt-Holger; Heinen, Gerhard; and Weiss, Gerhard, 4,882,484, Cl. 250-282.000.

Gaddis, Paul G.; and Perdelwitz, Lee E., Jr., to Weyerhaeuser Company. Absorbent article with tear line guide. 4,882,213, Cl. 428-136.000.

Gagner, Charles A. Unloading spout for grain trucks. 4,881,782, Cl. 298-7.000.

Gaissmaier, Rudi, to Watership PTY. Ltd. Expansion of sheet materials. 4,881,307, Cl. 29-6.100.

Galani, Zvi; Skinner, Malcolm E.; and Chiesa, John A. Center offset microwave frequency synthesizer. 4,882,549, Cl. 331-14.000.

Gall, Ray A., to Dana Corporation. Yoke for Hookes-type universal joint. 4,881,924, Cl. 464-134.000.

Gallant, Dennis J.: *See*—
Koerber, Clement J., Sr.; Gallant, Dennis J.; and Foster, L. Dale, 4,882,566, Cl. 340-825.690.

Galliani, Giulio: *See*—
Toja, Emilio; Gorini, Carlo; Barzaghi, Fernando; and Galliani, Giulio, 4,882,350, Cl. 514-425.000.

Gallimore, Bruce A. AM/FM radio with sunglass housing. 4,882,769, Cl. 455-344.000.

Gallmeyer, William W., to Donnelly Corporation. Information display for rearview mirrors. 4,882,565, Cl. 340-461.000.

Galvin, Richard W.; and Wilson, James W., to Wilson Antenna Inc. Base loaded antenna. 4,882,591, Cl. 343-715.000.

Gamma Lock (Proprietary) Limited: *See*—
Paizes, George, 4,881,331, Cl. 37-142.00A.

Ganster, Otto: *See*—
Neuhaus, Alfred; Ganster, Otto; and Mengal, Manfred, 4,882,363, Cl. 521-122.000.
Gantke, Franz, to Georg Fischer AG. Connecting element for offshore drilling rig. 4,881,851, Cl. 405-204.000.
Gantzhorn, John E., Jr.: *See*—
Billings, Wayne E.; Phillips, Robert F.; and Gantzhorn, John E., Jr., 4,882,636, Cl. 360-16.000.
Garcia, Larry. Golf putter. 4,881,739, Cl. 273-164.000.
Garcia, Ricardo: *See*—
McLaughlin, William; Lee, Doug; and Garcia, Ricardo, 4,881,308, Cl. 29-25.420.
Gardner, William T.: *See*—
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Garfinkle, Benjamin L., to Clamp Swing Pricing Co. Sign holder device. 4,881,707, Cl. 248-221.400.
Gariboldi, Roberto; and Gola, Alberto, to SGS-Thomson Microelectronics, s.r.l. Active overvoltage control for inductive load driving. 4,882,532, Cl. 323-222.000.
Garlich, Joseph R.: *See*—
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Garza, Cesar M.; Douglas, Monte A.; Loewenstein, Lee M.; and Davis, Cecil J., to Texas Instruments Incorporated. Dry development of photoresist. 4,882,008, Cl. 156-643.000.
Gasser, Oswald; and Ellrich, Klaus, to ESPE Stiftung & Co. Produktions- und Vertriebs KG. Polymerizable radiopaque dental composition. 4,882,365, Cl. 523-117.000.
Gasteier, Rolf: *See*—
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Gavish, Benjamin. Device and method for monitoring small desplacements of a peak in a frequency spectrum. 4,882,535, Cl. 324-585.00C.
Gay, Christian; and Lassiaz, Philippe, to Valeo. Clutch release bearing. 4,881,629, Cl. 192-98.000.
Gazzarini, Vinico, to Solis S.r.l. Method and apparatus for the automatic transfer of pantyhose and similar articles from a toe sewing machine to a drawing machine. 4,881,477, Cl. 112-121.150.
Gebelein, Rolin J. Fast, aberration-free flat field catadioptric telescope. 4,881,801, Cl. 350-503.000.
Gebrueder Buehler AG: *See*—
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Gehring, Reinhold; Klauke, Erich; Schallner, Otto; Stetter, Jorg; Santel, Hans-Joachim; and Schmidt, Robert R., to Bayer Aktiengesellschaft. Substituted 5-amino-1-phenylpyrazoles. 4,882,437, Cl. 548-362.000.
Geiger, Robert, Jr.: *See*—
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Gelorme, Jeffrey D.; Cox, Robert J.; and Gutierrez, Sergio A. R., to International Business Machines Corporation. Photoresist composition and printed circuit boards and packages made therewith. 4,882,245, Cl. 430-14.000.
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Brewer, Earl G.; Lee, Robert W.; and Croat, John J., 4,881,985, Cl. 148-103.000.
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Grogler, Gerhard; Ruckes, Andreas; Hess, Heinrich; and Kopp, Richard, to Bayer Aktiengesellschaft. Process for the production of cold-setting polyurethane urea elastomers. 4,882,411, Cl. 528-54.000.

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Hadassa Medical Organization: *See—*
Vlodavsky, Israel; Eldor, Amiram; Naparstek, Yaakov; and Cohen, Irun R., 4,882,318, Cl. 514-56.000.

Haddock, John T.; Miller, Charles A.; Moist, Stanford C., Jr.; Nauman, Warren D.; and Pala, Ronald S., to AMP Incorporated. Lanyard for disconnecting a connector of a cable assembly. 4,881,911, Cl. 439-484.000.

Haeder, Thomas Q.; and Shelbourn, William C., to Clark Equipment Company. Auxiliary coupler pressure relief hydraulic system with pump drive ignition switch relief. 4,881,371, Cl. 60-431.000.

Haessig, David A., Jr.: *See—*
Fuchs, Charles R.; Haessig, David A., Jr.; Heckathorn, David L.; Kass, Jordan S.; Lindsay, Peter; and Volpe, Joseph J., 4,881,800, Cl. 350-500.000.

Haessner, Winfried: *See—*
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Hafner, Bruce: *See—*
Petrucci, Raymond M.; Giordano, Edward; Hafner, Bruce; and Taylor, Bruce G., 4,882,061, Cl. 210-652.000.

Hafner, Josef; Bergmeier, Werner; Schonenberger, Rolf; and Fischer, Matthias, to Veit GmbH & Co. Suspension conveyor system. 4,881,468, Cl. 104-103.000.

Haga, Masakazu: *See—*
Hirata, Toichi; Haga, Masakazu; Hirami, Ichiro; and Yoshida, Kuniaki, 4,881,450, Cl. 91-459.000.

Hagerty, Robert F. Container for tablets, pills or the like. 4,881,648, Cl. 206-540.000.

Haidon Industrial Co., Ltd.: *See—*
Cho, Sung C., 4,881,638, Cl. 206-315.300.

Hajos, Gyorgy: *See—*
Tigyi, Gabor; Bozoky, Bela; Szegvari, Zsuzsanna; Frank, Tibor; Hajos, Gyorgy; Szporny, Laszlo; and Forgacs, Lilla, 4,882,336, Cl. 514-283.000.

Hakamada, Ichiro: *See—*
Murakami, Shu; Ikebe, Tsuguo; Hakamada, Ichiro; and Yaoka, Osamu, 4,882,326, Cl. 514-211.000.

Halfon, Yosef; and Hadar, Uzi, to Shekel Electronics-Scales Beit Keshet Electronics (Registered Partnership). Point-of-sale apparatus. 4,881,606, Cl. 177-126.000.

Hall, Alasdair S.: *See—*
Young, Ian R.; and Hall, Alasdair S., 4,882,560, Cl. 335-299.000.

Halloran, John W.: *See—*
Novich, Bruce E.; and Halloran, John W., 4,882,304, Cl. 501-32.000.

Halls, Neil G.; and Tomlinson, Roderick P. J., to Soltec Research Pty. Ltd. Aerosol product. 4,882,182, Cl. 426-116.000.

Hamada, Masataka: *See—*
Taniguchi, Nishinomiya; Ishida, Tokuji; Norita, Toshio; Hamada, Masataka; and Karasaki, Toshihiko, 4,882,601, Cl. 354-407.000.

Hamamatsu Photonics Kabushiki Kaisha: *See—*
Oba, Koichiro; Schoeps, Wilfried; and Taqqu, David, 4,882,480, Cl. 250-213.0VT.

Hamanaka, Tamotsu, to Tohatsu Corporation. Two-cycle internal combustion engine. 4,881,513, Cl. 123-664.000.

Hamano, Hiroaki: *See—*
Kato, Akio; Hamano, Hiroaki; and Ito, Hideo, 4,882,604, Cl. 355-201.000.

Hamm, Wilfred. Self-supporting unit element staircase. 4,881,351, Cl. 52-182.000.

Hammar, Richard H., to General Motors Corporation. Method of making positive battery paste. 4,881,944, Cl. 29-623.500.

Hammond, Rodney W.: *See—*
Alameel, George M.; and Hammond, Rodney W., 4,881,792, Cl. 350-96.200.

Hanafusa, Hiroshi: *See—*
Inoue, Yasunori; and Hanafusa, Hiroshi, 4,882,300, Cl. 437-236.000.

Hanawa, Hiroji: *See—*
Andrews, Dana; and Hanawa, Hiroji, 4,882,129, Cl. 422-186.200.

Hankvist, Bo A.; Kling, Peter N.; and Spongh, Rolf T., to Atlas Copco Aktiebolag. Device for insulating the spray liquid source from the high tension voltage of an electrostatic spray system when using an electrically conductive spray liquid. 4,881,688, Cl. 239-691.000.

Hannecart, Baudoin: *See—*
Cordemans De Meulenaer, Eric; and Hannecart, Baudoin, 4,882,525, Cl. 310-316.000.

Hansen, Loren F.; and Cozine, Mark L., to Outboard Marine Corporation. Turf aerating tine. 4,881,602, Cl. 172-22.000.

Hansen, Norman C., to Merit Industries, Inc. Electronically scored dart game having front opening service door. 4,881,744, Cl. 273-376.000.

Hanson, George E.: *See—*
Miller, Phillip; Shindley, Richard P.; Feltz, Kristi T.; Hanson, George E.; and White, Jonathan R., 4,882,475, Cl. 235-383.000.

Hansson, Gunnar C., to Atlas Copco Aktiebolag. Power tool for two step tightening of screw joints. 4,881,435, Cl. 81-469.000.

Hara, Kinichi: *See—*
Taguchi, Fumiaki; Mitsui, Isamu; Hara, Kinichi; Hayashi, Masaro; Ezawa, Kunio; Fukunaga, Kenichi; and Kuranari, Jun, 4,882,423, Cl. 530-380.000.

Harada, Hitoshi: *See—*
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Harada, Yoshio: *See—*
Yagi, Hiroshi; Fujita, Hisashi; Harada, Yoshio; and Takahashi, Kenichi, 4,881,319, Cl. 29-840.000.

Haragashira, Motoji, to Kabushiki Kaisha Toshiba. Automatic impedance adjuster for MRI system. 4,882,541, Cl. 324-322.000.

Harata, Mitsuo: *See—*
Furukawa, Osamu; Harata, Mitsuo; Yasumoto, Takaaki; and Imai, Motomasa, 4,882,652, Cl. 361-321.000.

Harbor Branch Oceanographic Institution, Inc.: *See—*
Higa, Tatsuo; and Scheuer, Paul J., 4,882,445, Cl. 549-546.000.

Hargreave, Francis M. Volleyball technique trainer. 4,881,742, Cl. 273-413.000.

Harmon, John R., to Libbey-Owens-Ford Co. Glass handling apparatus. 4,881,866, Cl. 414-607.000.

Harney, Donald E. Dual flush mechanism. 4,881,279, Cl. 4-324.000.

Harper, George S., to Airpax Corporation. Multipole circuit breaker system with differential pole operation. 4,882,557, Cl. 335-9.000.
Harris Corporation: *See—*
Young, William R., 4,882,698, Cl. 364-736.000.
Harris, Godfrey: *See—*
Borig, Donald A.; Harris, Godfrey; and Korngold, Gary P., 4,881,532, Cl. 128-80.00A.
Harris, Robert M., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State of or Defence in Her Britannic Majesty's Government of The. Coherent frequency exchange keying modulator. 4,882,552, Cl. 332-100.000.
Harris Semiconductor (Patents) Inc.: *See—*
Zuk, Borys, 4,882,749, Cl. 379-346.000.
Harris, Stephen J., to Loctite Corporation. Calixarene derivatives, and use of such compounds for sequestration of metals. 4,882,449, Cl. 556-419.000.
Harris, William G.; and Silva, Douglas J., to Boeing Company, The. Closed cycle electrical power system. 4,882,240, Cl. 429-17.000.
Harston, John C.; and Ford, Colin P., to Kliklok Corporation. Rotary transfer mechanism. 4,881,934, Cl. 493-315.000.
Hart Enterprises, Inc.: *See—*
Taylor, Glenn N., 4,881,551, Cl. 128-754.000.
Hartman, LeRoy. Tow frame. 4,881,603, Cl. 172-311.000.
Hartmann, Dirck T. ATB shock absorber. 4,881,750, Cl. 280-276.000.
Hartmann, Hans-Heinrich; and Streubel, Hans, to SMS Schloemann-Siemag Aktiengesellschaft. Mold for continuous casting of a flanged rollable billet for a rolled girder or beam and rollable billet made therewith. 4,881,589, Cl. 164-491.000.
Haruta, Masahiro: *See—*
Yuasa, Satoshi; Munakata, Hirohide; Yoshinaga, Yoko; Haruta, Masahiro; and Nishimura, Yukuo, 4,881,798, Cl. 350-353.000.
Harvey, Arthur E., Sr.; Harvey, Thomas J.; and Harvey, Donald H. Method of forming an anatomical occlusal surface configuration on a tooth-like member and stamp for use in connection therewith. 4,881,898, Cl. 433-215.000.
Harvey, Donald H.: *See—*
Harvey, Arthur E., Sr.; Harvey, Thomas J.; and Harvey, Donald H., 4,881,898, Cl. 433-215.000.
Harvey, John D.; and Gindre, Andre V., to Goodyear Tire & Rubber Company, The. Crack resistant coating for masonry structures. 4,882,219, Cl. 428-220.000.
Harvey, Thomas J.: *See—*
Harvey, Arthur E., Sr.; Harvey, Thomas J.; and Harvey, Donald H., 4,881,898, Cl. 433-215.000.
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Hasegawa, Akira; Takahashi, Susumu; Tsuji, Kiyoshi; Nishioka, Kimihiko; and Matsui, Hiroshi, to Olympus Optical Co., Ltd. High resolution image pickup system with color dispersion means. 4,882,619, Cl. 358-55.000.
Hasegawa, Hiroshi, to Olympus Optical Co., Ltd. Endoscope with a removable cover member. 4,881,810, Cl. 356-241.000.
Hasegawa, Masaaki: *See—*
Yamaguchi, Hideya; Hayasaki, Hiroyuki; Kawakami, Masamichi; Houjiyou, Yuji; Hobo, Yoshihiro; Arimatsu, Youichirou; Tsuji, Yasunori; Hasegawa, Masaaki; and Katou, Seiji, 4,882,630, Cl. 358-451.000.
Hasegawa, Norio: *See—*
Moriuchi, Noboru; Yamaguchi, Yoshiki; Tanaka, Toshihiko; Hasegawa, Norio; Kawamoto, Yoshifumi; Kimura, Shin-ichiro; Kaga, Toru; and Kure, Tokuo, 4,882,289, Cl. 437-52.000.
Hasegawa, Tetsuo: *See—*
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Hashimoto Corporation: *See—*
Hashimoto, Kazuo, 4,882,744, Cl. 379-57.000.
Hashimoto, Kazuo, to Hashimoto Corporation. Automatic paging system. 4,882,744, Cl. 379-57.000.
Hashimoto, Masashi; Kenji, Sasaki; and Nomura, Masayoshi, to Texas Instruments Incorporated. FIFO memory including dynamic memory elements. 4,882,710, Cl. 365-189.050.
Hashimoto, Shunichi: *See—*
Nagano, Eiki; Hashimoto, Shunichi; Yoshida, Ryo; Matsumoto, Hiroshi; and Kamoshita, Katsuzo, 4,881,970, Cl. 71-96.000.
Hashimoto, Yuichi: *See—*
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Hashiue, Masakazu, to Fuji Photo Film Co. Radiation image read-out and reproducing method. 4,882,488, Cl. 250-327.200.
Hassner, Martin A.: *See—*
Dimitri, Kamal E.; Hassner, Martin A.; and Siegel, Paul H., 4,882,583, Cl. 341-59.000.
Hastings, Catherine: *See—*
Staples, Linton D.; Norman, Robert I.; Davey, Robert B.; Hastings, Catherine; Kidd, Jennifer; and Rachmat, Jatni, 4,882,137, Cl. 424-423.000.
Hata, Daisuke: *See—*
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Hata, Yoshiaki: *See—*
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Hatase, Takayuki: *See—*
Ohno, Yoshimi; Hatase, Takayuki; and Hata, Daisuke, 4,881,799, Cl. 350-429.000.
Hatch, Richard N., to Velcro Industries. B.V. Method for adapting separable fasteners for attachment to other objects. 4,881,997, Cl. 156-66.000.
Hattori, Torao, to Honda Giken Kogyo Kabushiki Kaisha. Belt type continuously variable transmission for vehicle. 4,881,925, Cl. 474-18.000.
Hattori, Yasuji: *See—*
Inoue, Akira; and Hattori, Yasuji, 4,882,497, Cl. 250-560.000.
Hattori, Yoshimasa; and Furusho, Noboru, to Fuji Electric Co Ltd. AZO photoconductor for electrophotography. 4,882,255, Cl. 430-73.000.
Hattori, Yumi: *See—*
Shiokawa, Kozo; Tsuboi, Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, 4,882,344, Cl. 514-342.000.
Hauser, Ludwig; and Haessner, Winfried, to J. M. Voith GmbH. Dryer section. 4,881,327, Cl. 34-114.000.
Hayakawa, Motomu; and Yoshino, Masahito, to Seiko Epson Corporation. Charging circuit for an analog electronic timepiece. 4,882,717, Cl. 368-64.000.
Hayakawa, Shigeyuki; Isobe, Mitsuo; and Ohtani, Takayuki, to Kabushiki Kaisha Toshiba. Semiconductor memory device. 4,882,708, Cl. 365-189.040.
Hayama, Koh: *See—*
Tanaka, Yoshihiro; Tsuji, Sadafusa; Hata, Yoshiaki; Inoue, Manabu; Ootsuka, Hiroshi; Iwata, Michihiro; Ishito, Fumiaki; and Hayama, Koh, 4,882,602, Cl. 354-457.000.
Hayasaki, Hiroyuki: *See—*
Yamaguchi, Hideya; Hayasaki, Hiroyuki; Kawakami, Masamichi; Houjiyou, Yuji; Hobo, Yoshihiro; Arimatsu, Youichirou; Tsuji, Yasunori; Hasegawa, Masaaki; and Katou, Seiji, 4,882,630, Cl. 358-451.000.
Hayashi, Masaro: *See—*
Taguchi, Fumiaki; Mitsui, Isamu; Hara, Kinichi; Hayashi, Masaro; Ezawa, Kunio; Fukunaga, Kenichi; and Kuranari, Jun, 4,882,423, Cl. 530-380.000.
Hayashi, Shigeru; Saito, Takasui; Horiuchi, Shoji; and Takahashi, Tadashi, to Hideo Nagasu and Tohnichi Computer Applications Co., Ltd. Photoelectric conversion sensor with shifted arcuate elements. 4,882,478, Cl. 250-211.00R.
Haydu, Bartly A.: *See—*
Liverance, Martin K.; McMahan, David R.; and Haydu, Bartly A., 4,882,660, Cl. 362-226.000.
Hayes, Scott L., to Goex, Inc. Shaped charge. 4,881,445, Cl. 89-1.150.
Head, Robert A.; Cowan, Robert L.; and Law, Robert J., to General Electric Company. Method and apparatus for obtaining a water sample from the core of a boiling water reactor. 4,882,122, Cl. 376-245.000.
Healux, Inc.: *See—*
Lai, Jan-Ji; Smith, Kevin M.; and McCaul, Bruce W., 4,882,234, Cl. 514-185.000.
Heck, Lieselotte: *See—*
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Heckathorn, David L.: *See—*
Fuchs, Charles R.; Haessig, David A., Jr.; Heckathorn, David L.; Kass, Jordan S.; Lindsay, Peter; and Volpe, Joseph J., 4,881,800, Cl. 350-500.000.
Heckele, Helmut, to Richard Wolf GmbH. Endoscope. 4,881,523, Cl. 128-4.000.
Hecq, Andre , to Glaverbel. Matted glass. 4,882,214, Cl. 428-141.000.
Hefling, Dennis V., to Coleman Company, Inc., The. Propane-fueled cooking apparatus. 4,881,520, Cl. 126-44.000.
Hefner, Gerald E.: *See—*
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Hegasy, Ahmed, to Bayer Aktiengesellschaft. Solid, rapidly released medicament preparations containing dihydropyridines, and processes for their preparation. 4,882,144, Cl. 424-80.000.
Heid, George E., to Yale Security Inc. Exit device having length adjustment means for its concealed vertical rods. 4,881,765, Cl. 292-92.000.
Heider, David A.: *See—*
Ducharme, Cyril L.; Eickhof, Ralph C.; Heider, David A.; Neiberger, Denny W.; and Maass, Fred, 4,881,490, Cl. 119-1.000.
Heidjann, Franz, to Claas OHG. Self-propelling harvester thresher. 4,881,920, Cl. 460-66.000.
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Heinzel, Angelika, to Siemens Aktiengesellschaft. Redox battery. 4,882,241, Cl. 429-19.000.
Hellwig, John: *See—*
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Helwett-Packard Company: *See—*
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Helwig, Reinhard; and Hoch, Helmut, to BASF Aktiengesellschaft. Preparation of alkoxy(iso)violanthrenediones. 4,882,095, Cl. 552-279.000.

Henderson, Daniel A.; and Mostyn, William T., Jr. Programmable dialer system. 4,882,750, Cl. 379-355.000.

Hendry, Stuart P.: *See*—
Turner, Anthony P. F.; Hendry, Stuart P.; and Cardosi, Marco F., 4,882,013, Cl. 204-1.00T.

Henke, Mitchell C., to Lincoln Foodservice Products, Inc. Hot air oven having infra-red radiant surfaces. 4,881,519, Cl. 126-21.00A.

Henkel Kommanditgesellschaft auf Aktien: *See*—
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Monzyk, Bruce F.; and Henn, Arthur R., 4,882,132, Cl. 423-139.000.

Henneken, Bernhard; Kammerling, Burno; Scholz, Eckhard-K.; Schroeder, Wolfgang; and Krause, Hans, to Man Gutehoffnungshuette GmbH. Furnace charging throat construction. 4,881,869, Cl. 414-786.000.

Henning, Charles. Surgical instrument, and methods for forming a channel in a femoral condyle including reconstructing an anterior cruciate ligament. 4,881,537, Cl. 606-84.000.

Henning, Rainer: *See*—
Lerch, Ulrich; Henning, Rainer; and Kaiser, Joachim, 4,882,329, Cl. 514-253.000.

Hensley, Jerry C. Environmentally safe locking cap for monitoring well. 4,881,597, Cl. 166-92.000.

Heochst-Roussel Pharmaceuticals, Inc.: *See*—
Hrib, Nicholas J., 4,882,440, Cl. 549-383.000.

Hercules Incorporated: *See*—
Bell, Andrew, 4,882,401, Cl. 526-119.000.

Hergeth, Hubert. Device and method for highly accurate measurement of the thickness of fiber mats. 4,881,415, Cl. 73-865.800.

Herman, Alexander, to Codex Corporation. Networking circuitry. 4,882,728, Cl. 370-85.000.

Herolf, Olof, to OSA AB. Forest machine with crane. 4,881,865, Cl. 414-550.000.

Herr, Arthur; Welles, Toby S.; and Johnson, Robert W., to Reynard CVC, Inc. Article for storing optically readable and recordable disc devices. 4,881,640, Cl. 206-313.000.

Herrell, Dennis J.: *See*—
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Herrington, Thomas, to Johnson Matthey, Inc. Silver-glass paste. 4,881,974, Cl. 106-1.140.

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Herwig, Jens; Kolwert, Alois; Sutter, Hubert; and Woltjes, Dieter, to EC Erdoelchemie GmbH. Ionomer-modified polyethylene as film material. 4,882,393, Cl. 525-330.200.

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Grogler, Gerhard; Ruckes, Andreas; Hess, Heinrich; and Kopp, Richard, 4,882,411, Cl. 528-54.000.

Hess, Helmut: *See*—
Husslein, Julius; Hess, Helmut; and Beifuss, Wolfgang, 4,882,462, Cl. 219-10.55B.

Hewison, George D., to ITW Limited. Fastening assembly. 4,881,861, Cl. 411-383.000.

Hewlett-Packard Company: *See*—
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Heyman, Joseph S., to Measurement Resources Inc. Tooth stability monitor. 4,881,552, Cl. 128-774.000.

Hideo Nagasu and Tohnichi Computer Applications Co., Ltd.: *See*—
Hayashi, Shigeru; Saito, Takasui; Horiuchi, Shoji; and Takahashi, Tadashi, 4,882,478, Cl. 250-211.00R.

Higa, Tatsuo; and Scheuer, Paul J., to Harbor Branch Oceanographic Institution, Inc. Antitumor cyclohexanone compositions and derivatives thereof. 4,882,445, Cl. 549-546.000.

Higashimoto Kikai Co., Ltd.: *See*—
Higashimoto, Tsuyoshi, 4,881,458, Cl. 99-533.000.

Higashimoto, Tsuyoshi, to Higashimoto Kikai Co., Ltd. Method of and apparatus for dispersing and distributing a pickle in raw meat. 4,881,458, Cl. 99-533.000.

High Pressure Gas Safety Institute of Japan, The: *See*—
Nakane, Shinichi; Uno, Takashi; Horii, Hiroshi; Kato, Shinzo; Namba, Mitsuo; and Uematsu, Reppei, 4,881,948, Cl. 48-192.000.

Hikosaka, Mitsuhiro: *See*—
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Hill-Rom Company, Inc.: *See*—
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Hilliard, Jeffrey L.; and Moloney, Maurice M., to Hilliard, Jeffrey L. Probe for electrofusion, electroporation, or like procedure. 4,882,281, Cl. 435-287.000.

Hiltebrandt, Siegfried: *See*—
Boebel, Manfred; and Hiltebrandt, Siegfried, 4,881,524, Cl. 128-6.000.

Hilti Aktiengesellschaft: *See*—
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Riedl, Reinhard, 4,881,294, Cl. 16-114.00R.

Himes, Glenn R., to Shell Oil Company. High performance rubber compositions. 4,882,378, Cl. 524-505.000.

Hino, Motohito; and Bessho, Yoshinori, to Brother Kogyo Kabushiki Kaisha. Optical rotary encoder using dual frequency beat difference. 4,882,479, Cl. 250-231.0SE.

Hioki, Chieko: *See*—
Yoshinaga, Kazuo; Katagiri, Kazuharu; Tsuboyama, Akira; Kitayama, Hiroyuki; Shinjo, Kenji; and Hioki, Chieko, 4,882,085, Cl. 252-299.610.

Hipkins, James J.: *See*—
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Hirabayashi, Shigeto; and Sato, Hirokazu, to Konica Corporation. Silver halide photographic light-sensitive material with excellent color reproducibility. 4,882,267, Cl. 430-546.000.

Hirai, Kentaro; and Mizushima, Yukio, to Shionogi & Co., Ltd. Substituted isoquinoline derivatives and anti-ulcer agents. 4,882,338, Cl. 514-307.000.

Hiramatsu, Takeo, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Power transmission apparatus for vehicle of four-wheel drive type. 4,881,626, Cl. 192-60.000.

Hirami, Ichiro: *See*—
Hirata, Toichi; Haga, Masakazu; Hirami, Ichiro; and Yoshida, Kuniaki, 4,881,450, Cl. 91-459.000.

Hirasawa, Masahide: *See*—
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Hirata, Michiyuki: *See*—
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Hirata, Tatsushiro; and Uba, Tomohisa, to Sony Corporation. Cathode ray tube with internal double-wall magnetic shield. 4,882,516, Cl. 313-407.000.

Hirata, Toichi; Haga, Masakazu; Hirami, Ichiro; and Yoshida, Kuniaki, to Hitachi Construction Machinery Co., Ltd. Drive control system for hydraulic machine. 4,881,450, Cl. 91-459.000.

Hirose, Fuminori, to Nitto Kohki Co., Ltd. Piston for use in a gas pump. 4,881,455, Cl. 92-248.000.

Hirtz, Helmut. Operating system for high speed tunnel trains. 4,881,469, Cl. 104-138.100.

Hisamatsu, Kunio: *See*—
Sonobe, Kozo; Fukuzawa, Takashi; Takeuchi, Kohsuke; Tabata, Tatushi; Fukuoka, Hiroshi; Hisamatsu, Kunio; and Katamura, Makoto, 4,882,303, Cl. 501-28.000.

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Hitachi Automotive Engineering Co., Ltd.: *See*—
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Hitachi Construction Machinery Co., Ltd.: *See*—
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Hitachi, Ltd.: *See*—
Mochizuki, Takeshi; Arimoto, Akira; and Saito, Susumu, 4,882,483, Cl. 250-236.000.
Moriuchi, Noboru; Yamaguchi, Yoshiki; Tanaka, Toshihiko; Hasegawa, Norio; Kawamoto, Yoshifumi; Kimura, Shin-ichiro; Kaga, Toru; and Kure, Tokuo, 4,882,289, Cl. 437-52.000.
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Hitachi Microcomputer Engineering, Ltd.: *See*—
Shinsha, Takao; Morita, Masato; Sakataya, Yoshinori; Tsuchiya, Yoji; Hikosaka, Mitsuhiro; Koshishita, Junji; Akiyama, Keiho; and Kubo, Takashige, 4,882,690, Cl. 364-490.000.

Hitachi Software Engineering Co., Ltd.: *See*—
Shinsha, Takao; Morita, Masato; Sakataya, Yoshinori; Tsuchiya, Yoji; Hikosaka, Mitsuhiro; Koshishita, Junji; Akiyama, Keiho; and Kubo, Takashige, 4,882,690, Cl. 364-490.000.

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Hoechst Celanese Corporation: *See—*
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Hoecker, Manfred, to Kloeckner-Humboldt-Deutz AG. Injection pump with preinjection. 4,881,506, Cl. 123-503.000.
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Hoferer, Richard; Klotz, Arthur; Lehmann, Volker; and Trumpfheller, Gunter, to Filterwerk Mann & Hummel GmbH. Housing attachment assembly with a plastic attachment tab and a clip. 4,881,292, Cl. 16-2.000.
Hoffine, Harold C.; Forsythe, John; and Morgan, Leon. Method for storing toxic waste material. 4,881,849, Cl. 405-128.000.
Hoffman, Dieter; Munz, Wolf-Dieter; Siewert, G. A. Horst; and Dietrich, Horst, to Leybold Aktiengesellschaft; and Demetron Gesellschaft Fuer Elektronik-Werkstoffe mbH. Process and apparatus for sputter coating a gold alloy onto a substrate. 4,882,022, Cl. 204-192.150.
Hoffman-LA Roche Inc.: *See—*
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Hoffmann, Gunter: *See—*
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Hoffmann-La Roche Inc.: *See—*
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Hofrichter, Gerhard, to Messerschmitt-Boelkow-Blohm GmbH. Landing flap system. 4,881,704, Cl. 244-213.000.
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Hoheisel, Martin; Brunst, Gerhard; and Holzenkaempfer, Enno, to Siemens Aktiengesellschaft. Highly blocking thin film diode having a-Si:H for image sensor rows. 4,882,296, Cl. 437-184.000.
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Holderfield, Daron C.; Martin, Bernard E.; and Russell, Samuel S., to United States of America, Army. Specimen holder and rotary assembly. 4,881,411, Cl. 73-856.000.
Holker, Kenneth U.: *See—*
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Hollenberg, Detlef; Schneider, Hans; and Weihrauch, Georg, to Henkel Kommanditgesellschaft auf Aktien. Rotatable liquid hair treatment medium applicator. 4,881,558, Cl. 132-112.000.
Hollerback, James A. Vehicle automatic fueling assembly. 4,881,581, Cl. 141-113.000.
Holley, Carl A. Agglomeration device. 4,881,887, Cl. 425-222.000.
Hollis, Robert; Lewis, John E.; and Ackerman, Marvin, to Oceanic USA. Data sensing and processing device for scuba divers. 4,882,678, Cl. 364-413.310.
Holmes, Ann: *See—*
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Holter, Heinz; Igelbuscher, Heinrich; Gresch, Heinrich; Dewert, Heribert; and Rump, Hanns, to Holter, Heinz. Process for indicating the presence of toxic substances in air that is supplied to a personnel-occupied space. 4,882,287, Cl. 436-149.000.
Holtzman, Abraham M.; and Relis, Joseph, to Techno Instruments Investments 1983 Ltd. Use of immersion tin and tin alloys as a bonding medium for multilayer circuits. 4,882,202, Cl. 427-98.000.
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Horikoshi, Yoshiji: *See*—
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Horiuchi, Makota; Shimizu, Atsushi; Miyakawa, Yoshitaka; and Sakurai, Kazuya, to Nissin Kogyo Kabushiki Kaisha; and Honda Giken Kogyo Kabushiki Kaisha. Hydraulic booster device. 4,881,449, Cl. 91-372.000.

Horiuchi, Shoji: *See*—
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Horiuchi, Tetsuro; Goldman, Arnold E.; and Raghavan, Durai N., to Ensci, Inc. Lathanide series oxide modified alkaline-resistant glass. 4,882,302, Cl. 501-27.000.

Horn, Alan S., to Nelson Research & Development Co. Method for treating schizophrenia. 4,882,352, Cl. 514-438.000.

Hornlein, Robert W.; Logan, Joseph N.; Broadwin, Alan; and Podany, Vaclav O., to Cooper LaserSonics, Inc. Irrigation tubing connector for an ultrasonic surgical system. 4,881,761, Cl. 285-239.000.

Horstmann, Michael: *See*—
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Horton, Robert D.; and Farley, Doyle J. Self-dusting insecticide boot attachment. 4,881,671, Cl. 224-222.000.

Horwath, Robert O., to Nabisco Brands, Inc. Method of screening microorganisms for the production of extracellular enzymes. 4,882,273, Cl. 435-34.000.

Hosaka, Masao; Ogino, Yoshitaka; Shimada, Kazutoshi; and Saito, Takashi, to Canon Kabushiki Kaisha. Electronic load drive control apparatus. 4,882,778, Cl. 364-187.000.

Hoshi, Norio; Yamaguchi, Tetsuro; Okada, Yasuhiro; and Matsukawa, Takao, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle. 4,881,614, Cl. 180-225.000.

Hoshi, Satoshi: *See*—
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Hosiden Electronics Ltd.: *See*—
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Hoult, Robert A., to Perkin-Elmer Corporation, The. Scanning Michelson interferometer assembly. 4,881,814, Cl. 356-346.000.

Houser, Dan B., to RTC Industries, Inc. Display balloon holder. 4,881,916, Cl. 446-222.000.

Hovanic, Steven F.; and Bryce, David W., to Cooper Industries, Inc. Locking device for electrical switch or circuit breaker handle. 4,882,456, Cl. 200-43.150.

Howells, Geoffrey: *See*—
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Hsu, Joseph C.; and Guckenberger, Anthony C., to American National Can Company. Package having inseparable seals and a modified ply-separation opening. 4,881,649, Cl. 206-634.000.

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Huang, Chau-Ting; Pelosi, Stanford S., Jr.; and Bayless, Allan V., to Norwich Eaton Pharmaceuticals, Inc. N-hydroxy-5-phenyl-2-furancarboximidamides useful as cardiotonic agents. 4,882,354, Cl. 514-461.000.

Hubbard, Arthur J. Method of making heterogeneous blade-like metallic cutter member. 4,881,430, Cl. 76-104.00R.

Hubele, Adolf: *See*—
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Huels Aktiengesellschaft: *See*—
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Huels Aktiengsellschaft: *See*—
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Hughes, Philip A., to Exxon Production Research Company. Method for noise suppression in the stacking of seismic traces. 4,882,713, Cl. 367-47.000.

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Hugues, Patrice; and Perineau, Jean-Maurice, to Rhone-Poulenc Chimie. PVC woven diaphragm for the electrolysis of hydrochloric acid. 4,882,025, Cl. 204-252.000.

Hukvari, Istvan S.; Albert, Henry J.; Moon, Vernon G.; and Steffenson, Michael R., to Parr Instrument Company. Pressure and temperature reaction vessel, method, and apparatus. 4,882,128, Cl. 422-119.000.

Hull, Richard A.; Hull, Sheila I.; and Nowicki, Bogdan, to Baylor College of Medicine. Receptor specific proteins and their use in receptor typing. 4,882,425, Cl. 530-396.000.

Hull, Sheila I.: *See*—
Hull, Richard A.; Hull, Sheila I.; and Nowicki, Bogdan, 4,882,425, Cl. 530-396.000.

Huls Aktiengesellschaft: *See*—
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Hulsing, Rand H., II; Peters, Rex B.; and Norling, Brian L., to Sundstrand Data Control, Inc. Low profile accelerometer. 4,881,408, Cl. 73-517.0AV.

Humer, Mladen: *See*—
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Hunt, Anthony C.; and Pidgeon, Charles, to University of California, The Regents of the. Light sensitive liposomes. 4,882,165, Cl. 424-450.000.

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Hunter, Lemna J. Adjustable head support attachment for therapy table. 4,881,728, Cl. 269-328.000.

Hunter-Melnor, Inc.: *See*—
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Hunziker, Max, to Ciba-Geigy Corporation. Polyarylene disulfide. 4,882,415, Cl. 528-374.000.

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Huss, Ronald E.; and Feldman, Ellis S., to Hughes Aircraft Company. Method for locating a radio frequency emitter. 4,882,590, Cl. 342-453.000.

Husslein, Julius; Hess, Helmut; and Beifuss, Wolfgang, to Bosch-Siemens Hausgerate GmbH. Control apparatus for heating, defrosting and/or cooking foods with microwave energy. 4,882,462, Cl. 219-10.55B.

Hwo, Charles C., to Shell Oil Company. Blends of high molecular weight polybutylene with low density polyethylene. 4,882,229, Cl. 428-461.000.

Hygenic Corporation, The: *See*—
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Ibuki, Koji: *See*—
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Terashima, Kanetsugu; Ichihashi, Mitsuyoshi; Kikuchi, Makoto; Takeshita, Fusayuki; and Furukawa, Kenji, 4,882,086, Cl. 252-299.610.

Ichinose, Hisao, to Nissan Motor Co., Ltd. Sunroof panel assembly. 4,881,773, Cl. 296-216.000.

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Ideal Industries, Inc.: *See*—
Finn, Jerome W.; Montgomery, Robert L.; and Schuchard, Frank B., 4,881,322, Cl. 29-878.000.
IDEC IZUMI Corporation: *See*—
Tsuji, Yoshitaka, 4,881,903, Cl. 439-76.000.
Igarashi, Katsumasa: *See*—
Ushijima, Takayaki; Igarashi, Katsumasa; and Ishizeki, Seiichi, 4,881,785, Cl. 303-111.000.
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Igelbuscher, Heinrich: *See*—
Holter, Heinz; Igelbuscher, Heinrich; Gresch, Heinrich; Dewert, Heribert; and Rump, Hanns, 4,882,287, Cl. 436-149.000.
Iijima, Ikuo; Ozeki, Masakatsu; Saiga, Yutaka; Ishizuka, Tohru; and Nosaka, Kunio, to Tanabe Seiyaku Co., Ltd. Benzofuran derivative and processes for preparing the same. 4,882,340, Cl. 514-320.000.
Iijima, Tamotsu, to Nippon Seimitsu Kogyo Kabushiki Kaisha. Method for converting standing wave vibrations into motion and standing wave motor therefor. 4,882,500, Cl. 310-323.000.
Iino, Syuji: *See*—
Osawa, Izumi; Iino, Syuji; Hotomi, Hideo; Masaki, Kenji; and Doi, Isao, 4,882,256, Cl. 430-66.000.
Iino, Yutaka; and Shigemasa, Takashi, to Kabushiki Kaisha Toshiba. Adaptive process control system. 4,882,526, Cl. 318-561.000.
Iinuma, Humitoshi: *See*—
Yoshii, Takashi; and Iinuma, Humitoshi, 4,881,417, Cl. 74-15.840.
Iio, Tsukasa: *See*—
Fujii, Hiroshi; Iio, Tsukasa; Genba, Yasusi; Moriwaki, Hideaki; and Mochizuki, Yoshinori, 4,882,556, Cl. 335-8.000.
Ikada, Yoshito; Gen, Shokyu; Ohi, Shigeo; Urabe, Yosuke; and Kawashima, Hiroyuki, to Dow Corning Kabushiki Kaisha. Artificial skin. 4,882,162, Cl. 424-444.000.
Ikai, Takashi: *See*—
Yamamoto, Susumu; Kakuta, Takuya; Sato, Toshiaki; Morimoto, Katsushi; Oya, Eiichi; Ikai, Takashi; and Nawamaki, Tsutomu, 4,881,965, Cl. 71-92.000.
Ikebe, Tsuguo: *See*—
Murakami, Shu; Ikebe, Tsuguo; Hakamada, Ichiro; and Yaoka, Osamu, 4,882,326, Cl. 514-211.000.
Ikeda, Chikaho: *See*—
Shimizu, Norimitu; and Ikeda, Chikaho, 4,882,620, Cl. 358-75.000.
Ikeda, Kenji; Iwakura, Ken; and Takashima, Masanobu, to Fuji Photo Film Co., Ltd. Heat-sensitive recording material. 4,882,311, Cl. 503-208.000.
Ikeda, Masami: *See*—
Komuro, Hirokazu; and Ikeda, Masami, 4,881,318, Cl. 29-827.000.
Ikeda, Mitsuaki: *See*—
Kanbara, Susumu; Aihara, Kenji; Tomiku, Masato; Kawashima, Yoshio; Sawada, Tadashi; Okuda, Shinji; and Ikeda, Mitsuaki, 4,881,987, Cl. 148-12.00B.
Ikeuchi, Satoru; Arai, Mitutaka; Okuyama, Yuki; and Matsubara, Akitoshi, to Konica Corporation. Toner for development of electrostatic image and electrostatic latent image developer. 4,882,258, Cl. 430-108.000.
Ikuta, Tamao: *See*—
Matsuoka, Mikiharu; Yamada, Yasuhiro; Miyazaki, Yasuko; Kanemoto, Takashi; Katayama, Hirohiko; and Ikuta, Tamao, 4,881,900, Cl. 434-113.000.
Imagawa, Hiroyuki: *See*—
Ishimitsu, Keiichi; Imagawa, Hiroyuki; Yamada, Tomio; Matsuda, Michihiko; and Kitagawa, Yukio, 4,882,431, Cl. 540-603.000.
Imahori, Kazutomo; Kondo, Hitoshi; Nakajima, Hiroshi; and Iwasaki, Tatsuo, to Imahori, Kazutomo; Kenkyusho, Rikagaku; and Unitika Ltd. Process for producing physiologically active substance by multienzyme process. 4,882,276, Cl. 435-89.000.
Imai, Mizuho: *See*—
Tatsumi, Yuuichi; Minagawa, Hidenobu; Iwahashi, Hiroshi; Asano, Masamichi; and Imai, Mizuho, 4,882,507, Cl. 307-443.000.
Imai, Motomasa: *See*—
Furukawa, Osamu; Harata, Mitsuo; Yasumoto, Takaaki; and Imai, Motomasa, 4,882,652, Cl. 361-321.000.
IMC Fertilizer, Inc.: *See*—
Mizrahi, Joseph, 4,882,134, Cl. 423-356.000.
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Brierley, David; Kenyon, Ronald W.; and Ridyard, Denis R. A., 4,881,943, Cl. 8-662.000.
Clough, John M.; and Kay, Ian T., 4,882,341, Cl. 514-332.000.
Connor, Herbert G., 4,881,942, Cl. 8-532.000.
Dobson, Brian; Whyman, Peter J. M.; Doy, Ralph J.; Engel, Manfred O.; and Davies, Raymond, 4,882,444, Cl. 549-534.000.
Imperial Tobacco Limited: *See*—
Bolt, Anthony J. N.; and Sadd, John S., 4,881,555, Cl. 131-335.000.
Ims, Paul D. Handling device for hydraulic cylinder. 4,881,769, Cl. 294-15.000.
Imura, Satoshi: *See*—
Tanaka, Takashi; Imura, Satoshi; and Kida, Yasuji, 4,882,438, Cl. 548-407.000.
Inada, Hiroshi: *See*—
Okada, Osamu; Morita, Shigeki; Nakashita, Shigeto; Masai, Tadahisa; Tominaga, Shigeru; and Inada, Hiroshi, 4,881,474, Cl. 110-263.000.
INAX Corporation: *See*—
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INCO Alloys International, Inc.: *See*—
Smith, Gaylord D.; and Tassen, Curtis S., 4,882,125, Cl. 420-443.000.
Indiana University Foundation: *See*—
Lodder, Robert A., 4,882,493, Cl. 250-353.000.
Industrial Automation Services Pty Ltd.: *See*—
Thompson, Noel E.; Johns, Richard Martin; Rozmus, Gregory; Voss, George F.; Edwards, William J.; and Thomas, Peter J., 4,881,392, Cl. 72-7.000.
Industrial Technology Research Institute: *See*—
Liu, Jonq-Min; Chen, Tai-Jun; Tsai, Lii-Chyuan; and Pai, Li-Wen, 4,882,250, Cl. 430-58.000.
Ing. C. Olivetti & C., S.p.A.: *See*—
Falconieri, Remo; and Uggetti, Sergio, 4,881,837, Cl. 400-625.000.
Ingersoll-Rand Company: *See*—
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Pielet, Howard M.; Frank, Larry A.; Edgar, William; and Alavanja, Milan, 4,881,990, Cl. 148-320.000.
Innocorp Manufacturing, Inc.: *See*—
Kapp, Gregory W., 4,881,673, Cl. 224-311.000.
Ino, Juichi; Hishinuma, Akihiro; Nagayama, Hirotsugu; and Kawahara, Hideo, to Nippon Sheet Glass Co., Ltd. Method for production of oxide film. 4,882,183, Cl. 427-126.600.
Inobe, Kazuhiko; and Kanzaki, Masami, to Matsushita Electric Industrial Co., Ltd. Keyboard for a portable data terminal. 4,882,581, Cl. 341-22.000.
Inoue, Akira; and Hattori, Yasuji, to Sumitomo Electric Industries, Ltd. Method and apparatus of measuring outer diameter and structure of optical fiber. 4,882,497, Cl. 250-560.000.
Inoue, Hiromichi: *See*—
Ohno, Kouji; Saito, Shinichi; Miyazawa, Kazutoshi; Ushioda, Makoto; Inoue, Hiromichi; and Yoshida, Naoyuki, 4,882,084, Cl. 252-299.660.
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Tanaka, Yoshihiro; Tsuji, Sadafusa; Hata, Yoshiaki; Inoue, Manabu; Ootsuka, Hiroshi; Iwata, Michihiro; Ishito, Fumiaki; and Hayama, Koh, 4,882,602, Cl. 354-457.000.
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Inoue, Shuji: *See*—
Kageyama, Sadashi; Abe, Yoshio; Yasumoto, Yoshio; Inoue, Shuji; Takai, Hitoshi; Matsumoto, Mitsujiro; Aono, Kouji; Uchimura, Kiyoshi; and Iwasaki, Eiji, 4,882,614, Cl. 358-12.000.
Inoue, Yasunori; and Hanafusa, Hiroshi, to Agency of Industrial Science and Technology. Method of forming single crystalline magnesia spinel film. 4,882,300, Cl. 437-236.000.
Inoue, Yoshiaki: *See*—
Koizumi, Tadashi; Yokota, Seiji; Matsumura, Shigeo; and Inoue, Yoshiaki, 4,881,722, Cl. 266-176.000.
Inoue, Yukio: *See*—
Takeuchi, Setsuo; Kochi, Mutsuyuki; Kawarada, Akira; Esumi, Shinichiro; Sasaki, Kaguya; Kawabata, Shozo; Saita, Tsuneo; Inoue, Yukio; Yamamoto, Makoto; and Sekine, Keiji, 4,882,314, Cl. 514-23.000.
Institut Francais Du Petrole: *See*—
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Jarrin, Jacques; Robine, Magali; and Durand, Jean-Pierre, 4,882,404, Cl. 526-261.000.
Institut National de Recherche Chimique Appliquee (IRCHA): *See*—
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Integrated Device Technology, Inc.: *See*—
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Intelligent Surgical Lasers: *See*—
Bille, Josef F.; and Brown, Stuart I., 4,881,808, Cl. 351-221.000.
International Business Machines: *See*—
Mawla, Khalid A., 4,882,508, Cl. 310-13.000.
International Business Machines Corporation: *See*—
Bahl, Lalit R.; deSouza, Peter V.; Mercer, Robert L.; and Picheny, Michael A., 4,882,759, Cl. 381-51.000.
Dimitri, Kamal E.; Hassner, Martin A.; and Siegel, Paul H., 4,882,583, Cl. 341-59.000.
Evensen, Mark C., 4,882,699, Cl. 379-284.000.
Furman, Anatol, 4,882,505, Cl. 307-269.000.
Gelorme, Jeffrey D.; Cox, Robert J.; and Gutierrez, Sergio A. R., 4,882,245, Cl. 430-14.000.
Kovac, Caroline A.; Ledermann, Peter G.; and Nguyen, Luu T., 4,881,885, Cl. 425-121.000.
Schor, Marshall I., 4,882,691, Cl. 364-513.000.
Smith, Theoren P., III, 4,882,608, Cl. 357-22.000.
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International Flavors & Fragrances Inc.: *See*—
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Inuyama, Toshihiko: *See*—
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Ipsen Industries International Gesellschaft mit beschrankter Haftung: *See*—
Edenhofer, Bernd; and Pfau, Hans, 4,881,982, Cl. 148-16.500.
Irie, Masahiro, to Mitsubishi Chemical Industries Limited. Azaporphyrin compounds. 4,882,428, Cl. 540-121.000.
Irwin, Larry F. Hand stamping device or writing implement. 4,881,841, Cl. 401-195.000.
Isaacs, Jack L.; and Zvenyatsky, Boris, to United States Surgical Corporation. Surgical fastener cartridge with improved body tissue cutting knife assembly. 4,881,545, Cl. 227-178.000.
Isao, Sakai. Packaging container. 4,881,685, Cl. 229-115.000.
Isco, Inc.: *See*—
Allington, Robert W.; and Jones, John N., 4,882,063, Cl. 210-659.000.
Allington, Robert W., 4,882,781, Cl. 364-510.000.
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Ishida, Masato: *See*—
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Ishida, Minoru, to Marusan Co., Ltd. Spiral spring power source for toy. 4,881,621, Cl. 185-39.000.
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Ishida, Takeshi: *See*—
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Taniguchi, Nishinomiya; Ishida, Tokuji; Norita, Toshio; Hamada, Masataka; and Karasaki, Toshihiko, 4,882,601, Cl. 354-407.000.
Ishigami, Kazuhiro, to Nissan Motor Co., Ltd. Engine cooling apparatus for automotive vehicle. 4,881,494, Cl. 123-41.120.
Ishigami, Michifumi; and Sasaki, Toyonori, to Brother Kogyo Kabushiki Kaisha. Engaging device of a keyboard for a data processing unit. 4,882,684, Cl. 364-708.000.
Ishige, Yoshiki: *See*—
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Ishii, Akio: *See*—
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Ishii, Hideshi, to NEC Corporation. Lookahead program loop controller with register and memory for storing number of loop times for branch on count instructions. 4,882,701, Cl. 364-900.000.
Ishii, Jun: *See*—
Kobayashi, Osamu; Sugimoto, Osamu; Furuya, Yonezou; Ishida, Takeshi; Tanaka, Masanori; and Ishii, Jun, 4,881,630, Cl. 194-203.000.
Ishii, Keisuke: *See*—
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Czytko, Michael; Ishii, Kiyoshi; and Kawai, Kimitoshi, 4,882,277, Cl. 435-136.000.
Ishii, Shigeru, to Nissan Motor Co., Ltd. Control system for automotive transmission arrangement including lock-up clutch. 4,881,627, Cl. 192-0.076.
Ishikawa, Hisashi: *See*—
Yoshimura, Katsuji; Nakayama, Tadayoshi; Ishikawa, Hisashi; and Sato, Chikara, 4,882,615, Cl. 358-31.000.
Ishikawa, Yoshikazu; Yamaguchi, Kouji; and Sasajima, Kouji, to Honda Giken Kogyo Kabushiki Kaisha. Throttle valve control apparatus for internal combustion engine. 4,881,428, Cl. 74-859.000.
Ishimitsu, Keiichi; Imagawa, Hiroyuki; Yamada, Tomio; Matsuda, Michihiko; and Kitagawa, Yukio, to Nippon Soda Co., Ltd. Oxa(-thia)zolidine derivatives. 4,882,431, Cl. 540-603.000.
Ishito, Fumiaki: *See*—
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Isobe, Nobuyuki: *See*—
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Isobe, Shinichi; Miyata, Mitsuto; and Yamauchi, Takashi, to Fanuc Ltd. Numerical control system. 4,882,670, Cl. 364-188.000.
Isozumi, Shuzoo, to Mitsubishi Denki Kabushiki Kaisha; and. Engine starter. 4,881,416, Cl. 74-7.00A.
ITLA Corporation: *See*—
Suzuki, Katsumi; and Yang, Woo S., 4,881,917, Cl. 446-468.000.
Ito, Hideo: *See*—
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Ito, Hiroshi: *See*—
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Ito, Toru: *See*—
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Itoh, Kensuke: *See*—
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Itoh, Mikio, to Nippon Roki Co., Ltd. Cartridge filter incorporating a bag-like body. 4,882,051, Cl. 210-248.000.
Itoh, Tetsuo; Satoh, Noboru; Takahashi, Kazuhiko; Suminoe, Taro; and Shimizu, Takao, to Japan Synthetic Rubber Co., Ltd.; and Ricky Contact Lens, Inc. Non-hydrous soft contact lens and process for producing the same. 4,882,403, Cl. 526-245.000.
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Hewison, George D., 4,881,861, Cl. 411-383.000.
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Iwakura, Ken: *See*—
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Iwase, Hidehiro; and Habata, Keiichi, to Toshiba Chemical Corporation. Conductive resin composition and molded product using the same. 4,882,227, Cl. 428-407.000.
Iwaskow, Richard S.; and Crum, Stephen M., to American Cyanamid Company. Compositions convertible to reinforced conductive components and articles incorporating same. 4,882,089, Cl. 428-242.000.
Iwata, Michihiro: *See*—
Tanaka, Yoshihiro; Tsuji, Sadafusa; Hata, Yoshiaki; Inoue, Manabu; Ootsuka, Hiroshi; Iwata, Michihiro; Ishito, Fumiaki; and Hayama, Koh, 4,882,602, Cl. 354-457.000.
Izzo, Henry J.; Pincus, Stephen M.; Theiler, Jane B.; and Cirigliano, Michael C., to Thomas J. Lipton Inc. Edible spread and process for the preparation thereof. 4,882,187, Cl. 426-335.000.
J. Edwards Enterprises: *See*—
Jones, Dale G., 4,881,956, Cl. 55-84.000.
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Beisswanger, Rudolf, 4,881,695, Cl. 242-58.400.
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James, Robert B., Jr.: *See*—
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Jamesbury Corporation: *See*—
Champagne, Raymond P., 4,881,718, Cl. 251-209.000.
Jang, Choong-Gook. Dry direct compression compositions for controlled release dosage forms. 4,882,167, Cl. 424-468.000.
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Bohacek, Jan, 4,881,290, Cl. 15-228.000.
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Sano, Yasuro, 4,881,478, Cl. 112-259.000.
Jansen, Egbert, to Hoogovens Groep B.V. Method and apparatus for ironing the wall of a one-piece cylindrical body. 4,881,394, Cl. 72-45.000.
Jansky, Jaroslav; and Temmesfeld, Angelika, to Temtec Fahrzeugtechnik Entwicklungsgesellschaft mbH. Self-closing fuel tank seal. 4,881,655, Cl. 220-209.000.
Janssen, Gwen V.; and Rowland, Roy C. Hearing aid retention apparatus. 4,881,616, Cl. 181-129.000.
Japan Automatic Transmission Co., Ltd.: *See*—
Kobayashi, Masayuki; and Takiguchi, Masahiro, 4,881,429, Cl. 74-867.000.
Japan Electronic Control Systems Co., Ltd.: *See*—
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Japan Synthetic Rubber Co., Ltd.: *See*—
Itoh, Tetsuo; Satoh, Noboru; Takahashi, Kazuhiko; Suminoe, Taro; and Shimizu, Takao, 4,882,403, Cl. 526-245.000.

Jarrett, Eugene L.: *See*—
Cavender, Keith D.; Derderian, Edmond J.; Jarrett, Eugene L.; and Nielsen, Kenneth A., 4,882,107, Cl. 264-51.000.

Jarrin, Jacques; Robine, Magali; and Durand, Jean-Pierre, to Institut Francais du Petrole. Copolymer compositions derived from unsaturated triazines. 4,882,404, Cl. 526-261.000.

Jarvinen: *See*—
Reunamaki, Pauli T.; and Jarvinen, 4,881,962, Cl. 65-104.000.

JBI Corporation: *See*—
Bowe, Gerald J., 4,881,854, Cl. 405-303.000.

Jefferson International: *See*—
Braverman, Melvin; and Lazar, Joseph, 4,881,336, Cl. 40-530.000.

Jenike & Johanson, Inc.: *See*—
Dick, David S., 4,881,862, Cl. 414-218.000.

Jeuch, Pierre, to Commissiriat A l'Energie Atomique. Process for the production of electrical isolation zones in a CMOS integrated circuit. 4,882,291, Cl. 437-34.000.

Johansson, Jan H.; and Lunderius, Erik K., to Advanced Micro Devices, Inc. Low voltage and low power detector circuits. 4,882,506, Cl. 307-296.100.

John, Christian J.: *See*—
Webster, Charles A.; and John, Christian J., 4,881,892, Cl. 425-577.000.

Johns Hopkins University, The: *See*—
Newman, Arnold L., 4,881,939, Cl. 600-31.000.

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Thompson, Noel E.; Johns, Richard Martin; Rozmus, Gregory; Voss, George F.; Edwards, William J.; and Thomas, Peter J., 4,881,392, Cl. 72-7.000.

Johnson, Barrett; and Rubenstein, Charles B., to Ceramic Bonding, Inc. Process for the chemical bonding of heavy metals from sludge in the silicate structure of clays and shales and the manufacture of building and construction materials therewith. 4,882,067, Cl. 210-688.000.

Johnson, Brynte H.: *See*—
Eger, Edmond I., II; and Johnson, Brynte H., 4,881,541, Cl. 128-203.250.

Johnson, Gerald H., Jr.: *See*—
Lobel, Gary S.; Goldberg, Steven J.; and Johnson, Gerald H., Jr., 4,882,729, Cl. 370-85.100.

Johnson, Gordon H.: *See*—
Gettys, James R.; Johnson, Gordon H.; Demiray, Temel; and Faust, William D., 4,882,301, Cl. 501-17.000.

Johnson, Kim L.: *See*—
Temple, Michael D.; Seddon, Richard I.; and Johnson, Kim L., 4,882,198, Cl. 427-38.000.

Johnson, Mark E.: *See*—
Beyer, James D.; and Johnson, Mark E., 4,882,179, Cl. 426-36.000.

Johnson Matthey, Inc.: *See*—
Herrington, Thomas, 4,881,974, Cl. 106-1.140.

Johnson, Michael T. V.; and Maurer, Donald D., to Empi, Inc. Intravaginal electrode and stimulation system for controlling female urinary incontinence. 4,881,526, Cl. 128-24.500.

Johnson, Richard A., to C & K Systems, Inc. Intrusion detection system and a method therefor. 4,882,567, Cl. 340-522.000.

Johnson, Richard J.; Chenoweth, Dennis E.; Boggs, Daniel R.; and Lysaght, Michael J., to Baxter Travenol Laboratories, Inc. Methods of manufacturing nucleophilic material modified for improved biocompatibility. 4,882,106, Cl. 264-41.000.

Johnson, Robert W.: *See*—
Herr, Arthur; Welles, Toby S.; and Johnson, Robert W., 4,881,640, Cl. 206-313.000.

Johnson, Roy A.; and Lin, Chiu-Hong, to Upjohn Company, The. 3'-pyridinylalkylinden- and 3'-pyridinylalkylindol-2-carboxylic acids and analogs. 4,882,433, Cl. 546-273.000.

Johnson Service Company: *See*—
Thoma, Paul E.; AbuJodom, David N., II; and Fariabi, Sepehr, 4,881,981, Cl. 148-11.50R.

Johnston, J. O'Neal; and Holbert, Gene W., to Merrell Dow Pharmaceuticals Inc. 3β,17β-hydroxy-substituted steroids and related steroidal compounds. 4,882,322, Cl. 514-178.000.

Jolkovski, Robert M. Vise for joining frames. 4,881,726, Cl. 269-41.000.

Jones, Dale G., to J. Edwards Enterprises. Method and device for cleaning particulate-laden gases. 4,881,956, Cl. 55-84.000.

Jones, David N., to University of Sheffield, The. Steroid intermediates. 4,882,439, Cl. 549-336.000.

Jones, Harold C.: *See*—
Wackrow, Roger D.; and Jones, Harold C., 4,881,517, Cl. 124-65.000.

Jones, Jeff R. Break-away collar coupling device. 4,881,492, Cl. 119-106.000.

Jones, John N.: *See*—
Allington, Robert W.; and Jones, John N., 4,882,063, Cl. 210-659.000.

Jones, Josh B. Water bottle refill system. 4,881,661, Cl. 222-67.000.

Jones, Loyd W. Acidic surfactant solvent composition. 4,882,075, Cl. 252-8.553.

Jordan, Raymond L.; and Jordan, Rita A. Static free clothes dryer. 4,881,325, Cl. 34-60.000.

Jordan, Rita A.: *See*—
Jordan, Raymond L.; and Jordan, Rita A., 4,881,325, Cl. 34-60.000.

Jordan, Robert C.; and Portelli, Gene B., to Minnesota Mining and Manufacturing Company. Fiber reinforced composites with improved glass transition temperatures. 4,882,370, Cl. 523-215.000.

Ju, Shiaw: *See*—
Cozewith, Charles; Ju, Shiaw; and Verstrate, Gary W., 4,882,406, Cl. 526-336.000.

Jung, Lothar. Combination roll-type magnetic and electrostatic separator and method. 4,882,043, Cl. 209-212.000.

Junghans, Jurgen: *See*—
Marzinotto, Francesco; and Junghans, Jurgen, 4,881,770, Cl. 294-64.100.

Kabasin, Daniel F., to General Motors Corporation. Pedal force responsive engine controller. 4,881,502, Cl. 123-399.000.

Kabe, Kazuyuki; Suzuki, Tatsuo; and Takahashi, Ken, to Yokohama Rubber Co., Ltd., The. Heavy duty pneumatic radial tire. 4,881,587, Cl. 152-534.000.

Kabelmetal Electro GmbH: *See*—
Klebl, Wolfram; Bruenn, Rainer; and Staschewski, Harry, 4,881,489, Cl. 118-672.000.

Kabune, Hideki; Kamiya, Kohji; Miyake, Kiyoshi; Saito, Shigeru; Yamada, Shinichi; and Asami, Ken, to Nippondenso Co., Ltd.; and Toyota Jidosha Kabushiki Kaisha. Stepping motor control apparatus. 4,882,530, Cl. 318-696.000.

Kabushiki Kaisha Daiki Aluminium Kogyosho: *See*—
Yamaoka, Masao; and Toyota, Tomohiro, 4,881,670, Cl. 222-590.000.

Kabushiki Kaisha Sankyo Seiki Seisakusho: *See*—
Shirotori, Yozo, 4,882,643, Cl. 360-99.080.

Kabushiki Kaisha Shinsangyokaihatsu: *See*—
Nimura, Mitsuhiro; and Yokoyama, Shoji, 4,882,696, Cl. 364-449.000.

Kabushiki Kaisha Toshiba: *See*—
Furukawa, Osamu; Harata, Mitsuo; Yasumoto, Takaaki; and Imai, Motomasa, 4,882,652, Cl. 361-321.000.
Haragashira, Motoji, 4,882,541, Cl. 324-322.000.
Hayakawa, Shigeyuki; Isobe, Mitsuo; and Ohtani, Takayuki, 4,882,708, Cl. 365-189.040.
Iino, Yutaka; and Shigemasa, Takashi, 4,882,526, Cl. 318-561.000.
Komatsu, Shigeru, 4,882,290, Cl. 437-31.000.
Mizutani, Yoshihisa, 4,882,707, Cl. 365-185.000.
Sumiyoshi, Hajime, 4,882,624, Cl. 358-153.000.
Tatsumi, Yuuichi; Minagawa, Hidenobu; Iwahashi, Hiroshi; Asano, Masamichi; and Imai, Mizuho, 4,882,507, Cl. 307-443.000.
Tsuji, Masaki, 4,882,618, Cl. 358-167.000.
Tsunekawa, Shinichi; and Takagi, Masami, 4,882,520, Cl. 313-643.000.
Usui, Yasunori; Okamura, Hiroshi; Uetake, Yoshinari; and Fujiwara, Takashi, 4,882,612, Cl. 357-79.000.

Kadokura, Hidekimi; and Saegusa, Kunio, to Sumitomo Chemical Company, Limited. Lamina and a cosmetic comprising the same. 4,882,143, Cl. 424-59.000.

Kaessmann, Hans-Jurgen, to Opti-Patents-, Forschungs-und Fabrikations-AG. Wound-closure device and method. 4,881,546, Cl. 128-335.000.

Kaga, Toru: *See*—
Moriuchi, Noboru; Yamaguchi, Yoshiki; Tanaka, Toshihiko; Hasegawa, Norio; Kawamoto, Yoshifumi; Kimura, Shin-ichiro; Kaga, Toru; and Kure, Tokuo, 4,882,289, Cl. 437-52.000.

Kagawa, Junichi; Saiki, Yoshiaki; and Amano, Kozo, to NGK Spark Plug Co., Ltd. Spark plug with pressure sensor. 4,881,403, Cl. 73-115.000.

Kagelmaker, Horst: *See*—
Rosenthal, Andre; Hunger, Hans-Dieter; Kagelmaker, Horst; and Gratschus, Monika, 4,882,127, Cl. 422-50.000.

Kageyama, Sadashi; Abe, Yoshio; Yasumoto, Yoshio; Inoue, Shuji; Takai, Hitoshi; Matsumoto, Mitsujiro; Aono, Kouji; Uchimura, Kiyoshi; and Iwasaki, Eiji, to Matsushita Electric Industrial Co., Ltd. Multiplex signal processing apparatus. 4,882,614, Cl. 358-12.000.

Kai, Tomoko, to Canon Kabushiki Kaisha. Electronic equipment using a cover. 4,882,471, Cl. 235-1.00D.

Kaiser, Joachim: *See*—
Lerch, Ulrich; Henning, Rainer; and Kaiser, Joachim, 4,882,329, Cl. 514-253.000.

Kaiser, Wolfgang; and Schmutzler, Werner, to Siemens Aktiengesellschaft. Method for measuring resistances, in particular resistances of subscriber's lines of digital time division multiplex telecommunication networks. 4,882,742, Cl. 379-30.000.

Kaken Kagaku Kabushiki Kaisha: *See*—
Takeuchi, Setsuo; Kochi, Mutsuyuki; Kawarada, Akira; Esumi, Shinichiro; Sasaki, Kaguya; Kawabata, Shozo; Saita, Tsuneo; Inoue, Yukio; Yamamoto, Makoto; and Sekine, Keiji, 4,882,314, Cl. 514-23.000.

Kakizaki, Tadasu, to Yamaha Corporation. Electronic musical instrument with editor. 4,881,440, Cl. 84-609.000.

Kakuta, Takuya: *See*—
Yamamoto, Susumu; Kakuta, Takuya; Sato, Toshiaki; Morimoto, Katsushi; Oya, Eiichi; Ikai, Takashi; and Nawamaki, Tsutomu, 4,881,965, Cl. 71-92.000.

Kalnes, Tom N.; and James, Robert B., Jr., to UOP. Process for treating a temperature-sensitive hydrocarbonaceous stream containing a non-distillable component to produce a selected hydrogenated distillable light hydrocarbonaceous product. 4,882,037, Cl. 208-85.000.

Kamatsu Zenoah, Co.: *See*—
Terai, Akio; Yoshino, Junichi; Satsumi, Shinroku; and Taniguchi, Mitsuru, 4,881,363, Cl. 56-255.000.

Kamegaya, Shigeru: *See*—
Matayoshi, Yutaka; and Kamegaya, Shigeru, 4,881,497, Cl. 123-90.340.

Kamei, Motokazu: *See*—
Yoshioka, Shigehiko; Yamada, Hideto; Sato, Hisatake; and Kamei, Motokazu, 4,882,087, Cl. 252-312.000.

Kametani, Hiroshi: *See*—
Ono, Akira; Fuse, Toshikazu; Miyamoto, Osamu; Makino, Shoso; Yamato, Yoshihisa; Kametani, Hiroshi; Tokura, Susumu; Tanaka, Hiromi; Ito, Toru; Nakao, Hitomi; Tokuoka, Shuji; and Takeda, Toshihide, 4,882,220, Cl. 428-240.000.

Kamimura, Minoru: *See*—
Takashio, Masachika; Chikano, Takahide; and Kamimura, Minoru, 4,882,280, Cl. 435-228.000.

Kaminaga, Kouzou, to Sony Corporation. Method and apparatus for recording and/or reproducing digital data. 4,882,732, Cl. 371-2.200.

Kamisada, Koji, to Nihon Kaiheiki Industrial Company Ltd. Subminiature push-button switch. 4,882,461, Cl. 200-536.000.

Kamiya, Kohji: *See*—
Kabune, Hideki; Kamiya, Kohji; Miyake, Kiyoshi; Saito, Shigeru; Yamada, Shinichi; and Asami, Ken, 4,882,530, Cl. 318-696.000.

Kammer, Lothar: *See*—
Gonzalez, ReneA. A.; Nicolaisen, Heinz-Christian; and Kammer, Lothar, 4,882,001, Cl. 156-273.300.

Kammerling, Burno: *See*—
Henneken, Bernhard; Kammerling, Burno; Scholz, Eckhard-K.; Schroeder, Wolfgang; and Krause, Hans, 4,881,869, Cl. 414-786.000.

Kamoshita, Katsuzo: *See*—
Nagano, Eiki; Hashimoto, Shunichi; Yoshida, Ryo; Matsumoto, Hiroshi; and Kamoshita, Katsuzo, 4,881,970, Cl. 71-96.000.

Kamp, Ronald P. T.; and De Meij, Johannes P., to U.S. Philips Corporation. Getter arrangement having a getter detector and a post-heating timer. 4,881,914, Cl. 445-73.000.

Kamyr AB: *See*—
Richter, Johan C. F. C.; Ricter, Ole J.; and Jacobsen, Finn, 4,881,286, Cl. 8-156.000.

Kanazawa, Hideki. Cover plate retaining structure. 4,881,860, Cl. 411-55.000.

Kanazawa, Hirotaka; Note, Koushun; and Nakashima, Yasuhiro, to Mazda Motor Corporation. Four-wheel steering apparatus for vehicle. 4,881,613, Cl. 180-140.000.

Kanazawa, Kenichi: *See*—
Obana, Bunichi; and Kanazawa, Kenichi, 4,882,768, Cl. 455-207.000.

Kanbara, Susumu; Aihara, Kenji; Tomiku, Masato; Kawashima, Yoshio; Sawada, Tadashi; Okuda, Shinji; and Ikeda, Mitsuaki, to Sumitomo Metal Industries, Ltd. Process for direct softening heat treatment of rolled wire rods. 4,881,987, Cl. 148-12.00B.

Kanda, Taketoshi: *See*—
Fukui, Hiroshi; Namba, Ryujiro; Saito, Tsutomu; Ohtsu, Yutaka; Kimura, Asa; Nakano, Motokiyo; Nakata, Okitsugu; Tommita, Kenichi; Tokubo, Kazuo; Ohno, Kazuhisa; Yoneyama, Toshio; Ogawa, Takashi; Morohoshi, Hideo; Koyama, Junichi; Kanda, Taketoshi; Kawaguchi, Kunihiro; and Shimizu, Yuzo, 4,882,225, Cl. 428-405.000.

Kanebo, Ltd.: *See*—
Ono, Akira; Fuse, Toshikazu; Miyamoto, Osamu; Makino, Shoso; Yamato, Yoshihisa; Kametani, Hiroshi; Tokura, Susumu; Tanaka, Hiromi; Ito, Toru; Nakao, Hitomi; Tokuoka, Shuji; and Takeda, Toshihide, 4,882,220, Cl. 428-240.000.

Kanegae, Junji: *See*—
Maeda, Hirokazu; Yamaguchi, Mayumi; Uchiyama, Tetsuya; Baba, Hideki; Matsunami, Hidenobu; Ebihara, Yoshitaka; and Kanegae, Junji, 4,882,192, Cl. 426-607.000.

Kaneko, Kyoichi, to Daiwa Seiko, Inc. Reel with starting force spring casting. 4,881,697, Cl. 242-254.000.

Kaneko, Mitsuyoshi: *See*—
Maezawa, Akihiko; Nakajima, Yoshio; Kaneko, Mitsuyoshi; and Aoki, Shinji, 4,882,020, Cl. 204-157.300.

Kaneko, Shuzo: *See*—
Touma, Kouichi; Hasegawa, Tetsuo; Kushida, Naoki; Yaegashi, Hisao; Tamura, Yasuyuki; and Kaneko, Shuzo, 4,882,593, Cl. 346-111.000.

Kaneko, Tamaki, to O/A Technologies, Inc. Sorter. 4,881,730, Cl. 271-296.000.

Kaneko, Tatsushi: *See*—
Maruyama, Kazumasa; Kaneko, Tatsushi; and Chiba, Tohru, 4,882,517, Cl. 313-502.000.

Kanemoto, Takashi: *See*—
Matsuoka, Mikiharu; Yamada, Yasuhiro; Miyazaki, Yasuko; Kanemoto, Takashi; Katayama, Hirohiko; and Ikuta, Tamao, 4,881,900, Cl. 434-113.000.

Kaneoya, Masakazu: *See*—
Yoshida, Naoyuki; Kaneoya, Masakazu; and Uchida, Manabu, 4,882,451, Cl. 556-440.000.

Karesaki, Nobukazu, to Nissan Motor Company, Limited. Exhaust gas purifying apparatus. 4,881,369, Cl. 60-285.000.

Kanno, Kimio, to Toyoda Iron Works Co., Ltd. Parking-brake operating device. 4,881,425, Cl. 74-538.000.

Kanzaki Kokyukoki Mfg. Co. Ltd.: *See*—
Yano, Kazuhiko; Sakikawa, Shigenori; and Okanishi, Toshiaki, 4,881,612, Cl. 180-132.000.

Kanzaki, Masami: *See*—
Inobe, Kazuhiko; and Kanzaki, Masami, 4,882,581, Cl. 341-22.000.

Kanzaki Paper Manufacturing Co., Ltd.: *See*—
Arai, Naoto; Nojima, Masaharu; and Mandoh, Ritsuo, 4,882,310, Cl. 503-207.000.

Kapp, Gregory W., to Innocorp Manufacturing, Inc. Retractible support bar. 4,881,673, Cl. 224-311.000.

Karasaki, Toshihiko: *See*—
Taniguchi, Nishinomiya; Ishida, Tokuji; Norita, Toshio; Hamada, Masataka; and Karasaki, Toshihiko, 4,882,601, Cl. 354-407.000.

Karasawa, Akira: *See*—
Oshima, Etsuo; Obase, Hiroyuki; Karasawa, Akira; Kubo, Kazuhiro; Miki, Ichiro; and Ishii, Akio, 4,882,351, Cl. 514-431.000.

Kariya, Toshimitsu: *See*—
Aoike, Tatsuyuki; Sano, Masafumi; Yoshino, Takehito; Kariya, Toshimitsu; and Niino, Hiroaki, 4,882,251, Cl. 430-57.000.

Karl Mayer Textilmaschinenfabrik GmbH: *See*—
Mista, Kresimir, 4,881,693, Cl. 242-35.50A.

Kase, Masao: *See*—
Matsuura, Ryo; Isobe, Nobuyuki; and Kase, Masao, 4,882,722, Cl. 369-75.200.

Kashima Industries Co.: *See*—
Takimoto, Hideo; Tokuda, Katsuji; and Yamamoto, Koji, 4,882,216, Cl. 428-209.000.

Kasper, Steven J.: *See*—
Bardos, Thomas J.; Ho, Yau-Kwan; Kasper, Steven J.; and Hughes, Robert G., Jr., 4,882,147, Cl. 424-85.400.

Kass, Jordan S.: *See*—
Fuchs, Charles R.; Haessig, David A., Jr.; Heckathorn, David L.; Kass, Jordan S.; Lindsay, Peter; and Volpe, Joseph J., 4,881,800, Cl. 350-500.000.

Katagiri, Kazuharu: *See*—
Yoshinaga, Kazuo; Katagiri, Kazuharu; Tsuboyama, Akira; Kitayama, Hiroyuki; Shinjo, Kenji; and Hioki, Chieko, 4,882,085, Cl. 252-299.610.

Katamura, Makoto: *See*—
Sonobe, Kozo; Fukuzawa, Takashi; Takeuchi, Kohsuke; Tabata, Tatushi; Fukuoka, Hiroshi; Hisamatsu, Kunio; and Katamura, Makoto, 4,882,303, Cl. 501-28.000.

Katayama, Hirohiko: *See*—
Matsuoka, Mikiharu; Yamada, Yasuhiro; Miyazaki, Yasuko; Kanemoto, Takashi; Katayama, Hirohiko; and Ikuta, Tamao, 4,881,900, Cl. 434-113.000.

Kato, Akio; Hamano, Hiroaki; and Ito, Hideo, to Minolta Camera Kabushiki Kaisha. Electronic machine having time measuring function. 4,882,604, Cl. 355-201.000.

Kato, Heizaburo, to Sankyo Manufacturing Company, Ltd. Rolling contact device. 4,881,828, Cl. 384-127.000.

Kato, Shinzo: *See*—
Nakane, Shinichi; Uno, Takashi; Horii, Hiroshi; Kato, Shinzo; Namba, Mitsuo; and Uematsu, Reppei, 4,881,948, Cl. 48-192.000.

Kato, Yoshiaki; Tanaka, Masashi; Tsujita, Mitsuji; Kimoto, Keizo; Nishikawa, Hirotsugu; and Kawaguchi, Mika, to Mita Industrial Co., Ltd. Organic laminated photosensitive material of positive charging type. 4,882,253, Cl. 430-59.000.

Katou, Seiji: *See*—
Yamaguchi, Hideya; Hayasaki, Hiroyuki; Kawakami, Masamichi; Houjiyou, Yuji; Hobo, Yoshihiro; Arimatsu, Youichirou; Tsuji, Yasunori; Hasegawa, Masaaki; and Katou, Seiji, 4,882,630, Cl. 358-451.000.

Katsumura, Norimichi: *See*—
Takamura, Yoshinobu; Katsumura, Norimichi; Osawa, Nebuhiko; and Watanabe, Kazuo, 4,882,546, Cl. 329-310.000.

Katsuto, Fujita: *See*—
Tsuyoshi, Nagata; and Katsuto, Fujita, 4,881,289, Cl. 15-168.000.

Katz, Allen, to General Electric Company. Linearizer control system. 4,882,547, Cl. 330-149.000.

Kaufman, Herbert E. Drug delivery system. 4,882,150, Cl. 424-428.000.

Kautz, Rudolf: *See*—
Breitscheidel, Hans-Ulrich; Kautz, Rudolf; and Sandermann, Karl-Heinz, 4,882,208, Cl. 428-17.000.

Kawabata, Shozo: *See*—
Takeuchi, Setsuo; Kochi, Mutsuyuki; Kawarada, Akira; Esumi, Shinichiro; Sasaki, Kaguya; Kawabata, Shozo; Saita, Tsuneo; Inoue, Yukio; Yamamoto, Makoto; and Sekine, Keiji, 4,882,314, Cl. 514-23.000.

Kawagishi, Toshio; and Nakazyo, Kiyoshi, to Fuji Photo Film Co., Ltd. Silver halide color photographic material containing a pyrazoloazole magenta coupler. 4,882,266, Cl. 430-546.000.

Kawaguchi, Kunihiro: *See*—
Fukui, Hiroshi; Namba, Ryujiro; Saito, Tsutomu; Ohtsu, Yutaka; Kimura, Asa; Nakano, Motokiyo; Nakata, Okitsugu; Tommita, Kenichi; Tokubo, Kazuo; Ohno, Kazuhisa; Yoneyama, Toshio; Ogawa, Takashi; Morohoshi, Hideo; Koyama, Junichi; Kanda, Taketoshi; Kawaguchi, Kunihiro; and Shimizu, Yuzo, 4,882,225, Cl. 428-405.000.

Kawaguchi, Mika: *See*—
Kato, Yoshiaki; Tanaka, Masashi; Tsujita, Mitsuji; Kimoto, Keizo; Nishikawa, Hirotsugu; and Kawaguchi, Mika, 4,882,253, Cl. 430-59.000.

Kawahara, Hideo: *See*—
Ino, Juichi; Hishinuma, Akihiro; Nagayama, Hirotsugu; and Kawahara, Hideo, 4,882,183, Cl. 427-126.600.

Kawahara, Masafumi, to Sharp Kabushiki Kaisha. Monitor for blocked condition in tube for fluid infusion pump. 4,882,575, Cl. 340-608.000.

Kawai, Kimitoshi: *See*—
Czytko, Michael; Ishii, Kiyoshi; and Kawai, Kimitoshi, 4,882,277, Cl. 435-136.000.

Kawakami, Masamichi: *See*—
Yamaguchi, Hideya; Hayasaki, Hiroyuki; Kawakami, Masamichi; Houjiyou, Yuji; Hobo, Yoshihiro; Arimatsu, Youichirou; Tsuji, Yasunori; Hasegawa, Masaaki; and Katou, Seiji, 4,882,630, Cl. 358-451.000.

Kawakubo, Takamasa; Yoshida, Mitsuru; and Suda, Yoshihisa, to Mitsubishi Pencil Co., Ltd. Process for producing hard carbonaceous sheets. 4,882,102, Cl. 264-29.300.

Kawakubo, Takamasa; Yoshida, Mitsuru; and Suda, Yoshihisa, to Mitsubishi Pencil Co., Ltd. Process for producing carbon product having coarse and dense structure. 4,882,103, Cl. 264-29.500.

Kawamoto, Yoshifumi: *See*—
Moriuchi, Noboru; Yamaguchi, Yoshiki; Tanaka, Toshihiko; Hasegawa, Norio; Kawamoto, Yoshifumi; Kimura, Shin-ichiro; Kaga, Toru; and Kure, Tokuo, 4,882,289, Cl. 437-52.000.

Kawamura, Takao; Miyamoto, Naooki; Ito, Hiroshi; Takemura, Hitoshi; Ohkawa, Kazumasa; and Ishibitsu, Kokichi, to Kyocera Corporation; and Kawamura, Takao. Electrophotographic sensitive member with amorphous silicon carbide. 4,882,252, Cl. 430-58.000.

Kawarada, Akira: *See*—
Takeuchi, Setsuo; Kochi, Mutsuyuki; Kawarada, Akira; Esumi, Shinichiro; Sasaki, Kaguya; Kawabata, Shozo; Saita, Tsuneo; Inoue, Yukio; Yamamoto, Makoto; and Sekine, Keiji, 4,882,314, Cl. 514-23.000.

Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Kosuge, Hideyoshi, 4,881,610, Cl. 180-68.200.

Kawashima, Hiroyuki: *See*—
Ikada, Yoshito; Gen, Shokyu; Ohi, Shigeo; Urabe, Yosuke; and Kawashima, Hiroyuki, 4,882,162, Cl. 424-444.000.

Kawashima, Yoshio: *See*—
Kanbara, Susumu; Aihara, Kenji; Tomiku, Masato; Kawashima, Yoshio; Sawada, Tadashi; Okuda, Shinji; and Ikeda, Mitsuaki, 4,881,987, Cl. 148-12.00B.

Kawolics, Raymond P., to Meyer Company, The. Disposable valve with disk-like valve element. 4,881,664, Cl. 222-153.000.

Kay, Ian T.: *See*—
Clough, John M.; and Kay, Ian T., 4,882,341, Cl. 514-332.000.

Kazuno, Kenji: *See*—
Kise, Masahiro; Ozaki, Masakuni; Kazuno, Kenji; Tomii, Yoshifumi; Segawa, Jun; and Yasufuki, Shoji, 4,882,328, Cl. 514-236.200.

Keesen, Heinz-Werner; and Peters, Hartmut, to Deutsche Thomson-Brandt GmbH. Noise reduction system. 4,882,627, Cl. 358-166.000.

Kelkenberg, Heike; and Ruback, Wulf, to Huls Aktiengesellschaft. Use of polyhydroxyalkylamine-N-N-dicarboxylic acids and their salts as builders in detergents and cleaning agents. 4,882,091, Cl. 252-527.000.

Keller, Robert L. Tool for threading oversized rope through opening in an elastic strap. 4,881,434, Cl. 81-426.000.

Kelley, Mark, to Unitrode Corporation. Linear integrated circuit voltage drop generator having a base-10-emitter voltage independent current source therein. 4,882,533, Cl. 323-313.000.

Kellner, Bernd. Vacuum solar collector. 4,881,521, Cl. 126-438.000.

Kelly, Patrick M.: *See*—
Bosl, George F.; Kelly, Patrick M.; Alvarez, Dennis A.; Sauer, Gale; and Hocevar, Joseph A., 4,881,355, Cl. 52-738.000.

Kelsey, Donald R., to Amoco Corporation. Method for converting polyketals to polyaryletherketones in the presence of a metal salt. 4,882,397, Cl. 525-471.000.

Kendal, Jerry: *See*—
Ammon, J. Preston; and Kendal, Jerry, 4,881,904, Cl. 439-78.000.

Kenji, Sasaki: *See*—
Hashimoto, Masashi; Kenji, Sasaki; and Nomura, Masayoshi, 4,882,710, Cl. 365-189.050.

Kenkyusho, Rikagaku: *See*—
Imahori, Kazutomo; Kondo, Hitoshi; Nakajima, Hiroshi; and Iwasaki, Tatsuo, 4,882,276, Cl. 435-89.000.
Takeuchi, Setsuo; Kochi, Mutsuyuki; Kawarada, Akira; Esumi, Shinichiro; Sasaki, Kaguya; Kawabata, Shozo; Saita, Tsuneo; Inoue, Yukio; Yamamoto, Makoto; and Sekine, Keiji, 4,882,314, Cl. 514-23.000.

Kennedy, Christopher R.; Urquhart, Andrew W.; White, Danny R.; and Newkirk, Marc S., to Lanxide Technology Company, LP. Method for producing self-supporting ceramic bodies with graded properties. 4,882,306, Cl. 501-87.000.

Kennedy, Richard A.: *See*—
Marrah, Jeffrey J.; Manlove, Gregory J.; and Kennedy, Richard A., 4,882,548, Cl. 330-288.000.

Kenneth G. Kavanagh: *See*—
Lange, Edwin L., 4,881,768, Cl. 292-251.000.

Kenyon, Ian R.; Russell, Peter J.; and Taylor, Thomas, to Lever Brothers Company. Wash-softener containing amine on a crystal-growth-modified carbonate carrier. 4,882,074, Cl. 252-8.800.

Kenyon, Ronald W.: *See*—
Brierley, David; Kenyon, Ronald W.; and Ridyard, Denis R. A., 4,881,943, Cl. 8-662.000.

Kepiro, Joseph. Exercise device. 4,881,732, Cl. 272-73.000.

Keptel, Inc.: *See*—
Collins, Thomas J., 4,882,647, Cl. 361-119.000.

Kern, Ronald D., to Colgate-Palmolive Co. Fabric softening and antistatic particulate wash cycle laundry additive containing cationic/anionic surfactant complex on bentonite. 4,882,076, Cl. 252-8.800.

Ketonen, Lauri K. Jib-mounted suspension device for a timber harvester. 4,881,582, Cl. 144-3.00D.

KEURO Maschinenbau Gesellschaft mit beschrankter Haftung & Co. Kommanditgesellschaft: *See*—
Stolzer, Armin, 4,881,634, Cl. 198-372.000.

Khinchuk, Henry, to GTE Valenite Corporation. Apparatus for linear measurements. 4,881,324, Cl. 33-555.100.

Khoshkish, Kamran. Door sign device. 4,881,335, Cl. 40-449.000.

Khurgin, Boris. Two-resistor ice detector. 4,882,574, Cl. 340-581.000.

Kiang, Patty H.: *See*—
Romberg, Val G.; Kiang, Patty H.; Curry, Wayne T.; and Pfister, Ralph E., 4,882,210, Cl. 428-34.700.

Kida, Yasuji: *See*—
Tanaka, Takashi; Imura, Satoshi; and Kida, Yasuji, 4,882,438, Cl. 548-407.000.

Kidd Creek Mines Ltd.: *See*—
Borst, Nico; Talbot, Marc D.; and Scott, James D., 4,882,027, Cl. 204-286.000.

Kidd, Jennifer: *See*—
Staples, Linton D.; Norman, Robert I.; Davey, Robert B.; Hastings, Catherine; Kidd, Jennifer; and Rachmat, Jatni, 4,882,137, Cl. 424-423.000.

Kikuchi, Hideya: *See*—
Aoki, Hachiro; Kobayashi, Tadashi; Kuronuma, Junya; and Kikuchi, Hideya, 4,881,926, Cl. 474-25.000.

Kikuchi, Makoto: *See*—
Terashima, Kanetsugu; Ichihashi, Mitsuyoshi; Takeshita, Fusayuki; Kikuchi, Makoto; and Furukawa, Kenji, 4,882,083, Cl. 252-299.610.
Terashima, Kanetsugu; Ichihashi, Mitsuyoshi; Kikuchi, Makoto; Takeshita, Fusayuki; and Furukawa, Kenji, 4,882,086, Cl. 252-299.610.

Kilb, Manfred; and Degen, Klaus D., to Christoph Emmerich GmbH & Co. KG. Closed gastight battery, in particular nickel-cadmium. 4,882,242, Cl. 429-154.000.

Kim, Byoung Y.; Carrara, Sidney L. A.; and Shaw, Herbert J., to Leland Stanford Junior University, The Board of Trustees of the. Fiber optic rotation sensor utilizing high birefringence fiber and having reduced intensity type phase errors. 4,881,817, Cl. 356-350.000.

Kim, Hongzoon; Saunders, Edward C.; and Miller, Harris, to Olin Hunt Specialty Products Inc. Color developer composition. 4,882,264, Cl. 430-467.000.

Kimberly-Clark Corporation: *See*—
Warner, Steven B., 4,882,230, Cl. 428-516.000.

Kimizuka, Junichi; Ushio, Yukihide; Seto, Kaoru; Hori, Kenjiro; and Inuyama, Toshihiko, to Canon Kabushiki Kaisha. Safety apparatus for detecting an abnormality of power control element. 4,882,782, Cl. 361-100.000.

Kimmel, David J.: *See*—
Demler, Henry W., Jr.; Dola, Frank P.; Kimmel, David J.; Lauterbach, John H.; Sotolongo, Thomas J.; and Zwieg, Grover A., 4,881,905, Cl. 439-79.000.

Kimoto, Keizo: *See*—
Kato, Yoshiaki; Tanaka, Masashi; Tsujita, Mitsuji; Kimoto, Keizo; Nishikawa, Hirotsugu; and Kawaguchi, Mika, 4,882,253, Cl. 430-59.000.

Kimura, Asa: *See*—
Fukui, Hiroshi; Namba, Ryujiro; Saito, Tsutomu; Ohtsu, Yutaka; Kimura, Asa; Nakano, Motokiyo; Nakata, Okitsugu; Tommita, Kenichi; Tokubo, Kazuo; Ohno, Kazuhisa; Yoneyama, Toshio; Ogawa, Takashi; Morohoshi, Hideo; Koyama, Junichi; Kanda, Taketoshi; Kawaguchi, Kunihiro; and Shimizu, Yuzo, 4,882,225, Cl. 428-405.000.

Kimura, Ippo; Okumura, Naoyuki; Aruga, Tomoe; and Arai, Yoshio, to Seiko Epson Corporation. Magnetic head supporting mechanism. 4,882,644, Cl. 360-104.000.

Kimura, Shin-ichiro: *See*—
Moriuchi, Noboru; Yamaguchi, Yoshiki; Tanaka, Toshihiko; Hasegawa, Norio; Kawamoto, Yoshifumi; Kimura, Shin-ichiro; Kaga, Toru; and Kure, Tokuo, 4,882,289, Cl. 437-52.000.

Kimura, Takao: *See*—
Nakajima, Yoshio; Kimura, Takao; and Nagaoka, Yoshinobu, 4,882,108, Cl. 264-54.000.

Kimura, Toshiyuki; Aoyagi, Yoshio; and Endo, Fumio, to Pioneer Electronic Corporation. Disk playing method for disk player. 4,882,719, Cl. 369-32.000.

Kin, Lai, to Windmere Corporation. Hair curling system. 4,881,559, Cl. 132-226.000.

King, Francis D., to Beecham Group p.l.c. Certain heterocyclic N-substituted carboxamides. 4,882,327, Cl. 514-219.000.

King, Homer F.: *See*—
King, Michael; and King, Homer F., 4,881,787, Cl. 312-42.000.

King, Michael; and King, Homer F., to H. King and Associates. Package storage, display and dispensing apparatus. 4,881,787, Cl. 312-42.000.

King-Seeley Thermos Co.: *See*—
Mrugala, Ronald J.; Raymer, Doyle; Negandhi, Dipak J.; and Latzko, Robert L., 4,881,380, Cl. 62-389.000.

Kinkel, Joachim: *See*—
Blaschke, Gottfried; Fraenkel, Werner; Broker, Werner; and Kinkel, Joachim, 4,882,048, Cl. 210-198.200.

Kinugasa, Toshiyuki: *See*—
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Kirby, Steven B.: *See*—
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Kirchanski, Stefan J.; and Wardwell, Kathleen, to Ortho Pharmaceutical Corporation. Method for quantitating and differentiating white blood cells. 4,882,284, Cl. 436-63.000.

Kirchgessner, David A.; and Lorrain, Jeffrey M., to United States of America, America Environmental Protection Agency. Lignosulfonate-modified calcium hydroxide for SO2 control during furnace injection. 4,882,309, Cl. 502-401.000.

Kirkup, Michael P.: *See*—
McCombie, Stuart W.; Kirkup, Michael P.; and Boland, Amy Sommese, 4,882,429, Cl. 540-357.000.

Kise, Masahiro; Ozaki, Masakuni; Kazuno, Kenji; Tomii, Yoshifumi; Segawa, Jun; and Yasufuki, Shoji, to Nippon Shinyaku Co. Ltd. Thiazetidine derivatives. 4,882,328, Cl. 514-236.200.

Kitagawa Industries Co., Ltd.: *See*—
Fujioka, Akio, 4,882,561, Cl. 336-65.000.

Kitagawa, Toshiharu: *See*—
Takita, Masaaki; Tsuru, Yoshikazu; Kitagawa, Toshiharu; and Nomura, Yoshikazu, 4,881,831, Cl. 400-120.000.

Kitagawa, Yukio: *See*—
Ishimitsu, Keiichi; Imagawa, Hiroyuki; Yamada, Tomio; Matsuda, Michihiko; and Kitagawa, Yukio, 4,882,431, Cl. 540-603.000.

Kitami, Tetsu; and Mito, Jun, to Yokohama Rubber Co., Ltd., The. Hose for transport of refrigerant fluids and fuel oils. 4,881,576, Cl. 138-125.000.

Kitatani, Katsugi; and Hoshi, Satoshi, to Fuji Photo Film Co., Ltd. Tetrakisazo photoconductive composition and electrophotographic photoreceptor using the same. 4,882,249, Cl. 430-56.000.

Kitayama, Hiroyuki: *See*—
Yoshinaga, Kazuo; Katagiri, Kazuharu; Tsuboyama, Akira; Kitayama, Hiroyuki; Shinjo, Kenji; and Hioki, Chieko, 4,882,085, Cl. 252-299.610.

Kitterman, Lawrence R.; and Rohr, Robert D., to Seaquist Closures, A division of Pittway Corporation. Closure with open lid retainer. 4,881,668, Cl. 222-482.000.

Klagsbrun, Michael, to Children's Medical Center Corporation, The. Method of purifying endothelial cell growth factors using immobilized heparin. 4,882,275, Cl. 435-68.000.

Klauke, Erich: *See*—
Gehring, Reinhold; Klauke, Erich; Schallner, Otto; Stetter, Jorg; Santel, Hans-Joachim; and Schmidt, Robert R., 4,882,437, Cl. 548-362.000.

Klebe, Gerhard: *See*—
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Klebl, Wolfram; Bruenn, Rainer; and Staschewski, Harry, to Kabelmetal Electro GmbH. Color coding light wave conductors. 4,881,489, Cl. 118-672.000.

Klein, Henry: *See*—
Kondziolka, Stanley F.; and Klein, Henry, 4,882,688, Cl. 364-519.000.

Kliklok Corporation: *See*—
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Kling, Lothar: *See*—
von der Saal, Wolfgang; Holck, Jens-Peter; Mertens, Alfred; Muller-Beckmann, Bernd; and Kling, Lothar, 4,882,342, Cl. 514-338.000.

Kling, Peter N.: *See*—
Hankvist, Bo A.; Kling, Peter N.; and Spongh, Rolf T., 4,881,688, Cl. 239-691.000.

Klockner-Becorit GmbH: *See*—
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Klockner, Jurgen: *See*—
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Kloeckner-Humboldt-Deutz AG: *See*—
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Klotz, Arthur: *See*—
Hoferer, Richard; Klotz, Arthur; Lehmann, Volker; and Trumpfheller, Gunter, 4,881,292, Cl. 16-2.000.

Knez, Jordan. Apparatus for treating round objects. 4,881,287, Cl. 15-21.00A.

Knight, William R.: *See*—
Trueba, Kenneth E.; Knight, William R.; and Nielsen, Niels J., 4,882,595, Cl. 346-140.00R.

Kniskern, Peter J.: *See*—
Marburg, Stephen; Kniskern, Peter J.; and Tolman, Richard L., 4,882,317, Cl. 514-54.000.

Knowles, Steven C.: *See*—
Smith, William W.; and Knowles, Steven C., 4,882,465, Cl. 219-121.480.

Kobari, Katsuo; Takekoshi, Yoshitaka; and Taniguchi, Mitsuyuki, to Fanuc Ltd. Pulse encoder. 4,882,529, Cl. 318-602.000.

Kobayashi, Masayuki; and Takiguchi, Masahiro, to Nissan Motor Co., Ltd.; and Japan Automatic Transmission Co., Ltd. Shift control arrangement for automatic transmission. 4,881,429, Cl. 74-867.000.

Kobayashi, Osamu; Sugimoto, Osamu; Furuya, Yonezou; Ishida, Takeshi; Tanaka, Masanori; and Ishii, Jun, to Nippon Conlux Co., Ltd. Coin discriminating apparatus. 4,881,630, Cl. 194-203.000.

Kobayashi, Tadashi: *See*—
Aoki, Hachiro; Kobayashi, Tadashi; Kuronuma, Junya; and Kikuchi, Hideya, 4,881,926, Cl. 474-25.000.

Kobayashi, Takeshi; and Asai, Junichi, to Seiko Seiki Kabushiki Kaisha. Gas compressor of variable volume. 4,881,878, Cl. 417-295.000.

Kobayashi, Yoshinobu, to Sumitomo Electric Industries, Ltd. Integrated circuit for controlling the loads of automobile circuitry. 4,882,502, Cl. 307-247.100.

Kober, Reiner: *See*—
Saupe, Thomas; Klebe, Gerhard; Schirmer, Ulrich; Paul, Gerhard; Kober, Reiner; Wuerzer, Bruno; Berghaus, Rainer; Meyer, Norbert; and Westphalen, Karl-Otto, 4,881,969, Cl. 71-94.000.

Koch, James K.: *See*—
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Kochi, Mutsuyuki: *See*—
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Koelsch, Lester M. Submersible bearing assembly. 4,881,829, Cl. 384-448.000.

Koerber, Clement J., Sr.; Gallant, Dennis J.; and Foster, L. Dale, to Hill-Rom Company, Inc. Safety control system for a hospital bed. 4,882,566, Cl. 340-825.690.

Kohara, Hidekatsu; Tokutake, Nobuo; Miyabe, Masanori; Nakayama, Toshimasa; Asaumi, Shingo; Tanaka, Hatsuyuki; and Arai, Yoshiaki, to Tokyo Ohka Kogyo Co., Ltd. Positive-working photosensitive quinone diazide composition with alkali insoluble dye and alkali soluble dye. 4,882,260, Cl. 430-191.000.

Kohle, Michael R.; and Priebe, Durward H., to CTS Corporation. Method of making vented seal for electronic components and an environmentally protected component. 4,881,320, Cl. 29-841.000.

Koizumi, Masaru: *See*—
Uzuda, Tetsuji; Kuramoto, Takashi; Onga, Takeo; Suzuki, Teruo; Koizumi, Masaru; and Kondo, Takeo, 4,882,622, Cl. 358-80.000.

Koizumi, Noboru; and Yamazaki, Kazuya, to Matsushita Electric Industrial Co., Ltd. Permanent magnet type demagnetizing head. 4,882,559, Cl. 335-284.000.

Koizumi, Tadashi; Yokota, Seiji; Matsumura, Shigeo; and Inoue, Yoshiaki, to Neturen Company Limited. Apparatus for producing superfine particle. 4,881,722, Cl. 266-176.000.

Koizumi, Takashi: *See*—
Uekusa, Tadashi; Koizumi, Takashi; and Amano, Nobuhiko, 4,882,544, Cl. 324-511.000.

Kojima, Takio; and Taniguchi, Masato, to NGK Spark Plug Co., Ltd. Poppet valve made of ceramics. 4,881,500, Cl. 123-188.0AA.

Kojima, Yasuhiko; Pilot, John; and Waxman, Burton H., to Polychrome Corp.; and Dainippon Ink & Chemicals, Inc. High contrast dot enhancing compositions and photographic products and methods for their use. 4,882,261, Cl. 430-264.000.

Kolb, Robert E., to Minnesota Mining and Manufacturing Company. Fluoroelastomer composition with organo-onium compounds. 4,882,390, Cl. 525-326.300.

Kolwert, Alois: *See*—
Herwig, Jens; Kolwert, Alois; Sutter, Hubert; and Woltjes, Dieter, 4,882,393, Cl. 525-330.200.

Komatsu, Shigeru, to Kabushiki Kaisha Toshiba. Semiconductor device and a method of manufacturing the same. 4,882,290, Cl. 437-31.000.

Komori, Shinji; Takata, Hidehiro; Tamura, Toshiyuki; and Asai, Fumiyasu, to Mitsubishi Denki Kabushiki Kaisha. Hand-shake type data transfer control circuit. 4,882,704, Cl. 364-900.000.

Komuro, Hirokazu; and Ikeda, Masami, to Canon Kabushiki Kaisha. Method of manufacturing a liquid jet recording head. 4,881,318, Cl. 29-827.000.

Komuro, Katsumi, to AMP Incorporated. Method and apparatus for making a harness. 4,881,321, Cl. 29-861.000.

Kondo, Hitoshi: *See*—
Imahori, Kazutomo; Kondo, Hitoshi; Nakajima, Hiroshi; and Iwasaki, Tatsuo, 4,882,276, Cl. 435-89.000.

Kondo, Nobuaki, to Nissan Motor Co., Ltd. Latch device for foldable backrest of automotive seat. 4,881,767, Cl. 292-224.000.

Kondo, Takeo: *See*—
Uzuda, Tetsuji; Kuramoto, Takashi; Onga, Takeo; Suzuki, Teruo; Koizumi, Masaru; and Kondo, Takeo, 4,882,622, Cl. 358-80.000.

Kondo, Toshio, to Aisin Seiki Kabushiki Kaisha. Disk brake assembly. 4,881,623, Cl. 188-73.380.

Kondziolka, Stanley F.; and Klein, Henry, to Demco Bingo Inc. Computer-controlled method and apparatus for making bingo cards. 4,882,688, Cl. 364-519.000.

Konica Corporation: *See*—
Hirabayashi, Shigeto; and Sato, Hirokazu, 4,882,267, Cl. 430-546.000.
Ikeuchi, Satoru; Arai, Mitutaka; Okuyama, Yuki; and Matsubara, Akitoshi, 4,882,258, Cl. 430-108.000.
Koshizuka, Kunihiro; and Abe, Takao, 4,882,218, Cl. 428-216.000.

Konig, Johannes; and Reuter, Martin, to Gewerschaft Eisenhutte Westfalia GmbH. Power supply arrangement for electro-hydraulic control systems in mining and civil engineering. 4,882,501, Cl. 307-11.000.

Kono, Yoichiro; Kumagai, Yasuaki; Takeda, Nobuaki; and Ogita, Hiroshi, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Exhaust emission purifier for diesel engines. 4,881,959, Cl. 55-267.000.

Konzal, Daryl; and Salnajs, Gunars, to International Paper Company. High capacity package seal, sever, and brick apparatus and method. 4,881,360, Cl. 53-439.000.

Koo, Kee P.; Bucholtz, Frank; and Dandridge, Anthony, to United States of America, Navy. Passive stabilization of a fiber optic nonlinear interferometric sensor. 4,881,813, Cl. 356-345.000.

Kopf, Henry B. Filter plate, filter plate element, and filter comprising same. 4,882,050, Cl. 210-231.000.

Kopp, Richard: *See*—
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Ruckes, Andreas; Grogler, Gerhard; and Kopp, Richard, 4,882,361, Cl. 521-51.000.
Koppenberg, Bruce G. Concrete molding system with tubs. 4,881,714, Cl. 249-60.000.
Korngold, Gary P.: *See*—
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Kortec AG: *See*—
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Kortenbrede, Ludger, to Aug. Winkhaus GmbH & Co. KB. Shackle lock. 4,881,387, Cl. 70-39.000.
Koser, James R.: *See*—
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Koshishita, Junji: *See*—
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Koshizuka, Atsuo, to Fujitsu Limited. Bipolar-complementary metal oxide semiconductor inverter. 4,882,534, Cl. 323-351.000.
Koshizuka, Kunihiro; and Abe, Takao, to Konica Corporation. Thermal transfer recording medium. 4,882,218, Cl. 428-216.000.
Kosuge, Hideyoshi, to Kawasaki Jukogyo Kabushiki Kaisha. Guide for hot air from radiator in four wheeled vehicle operated by driver in sitting posture. 4,881,610, Cl. 180-68.200.
Kothe, Lutz. Medical instrument. 4,881,550, Cl. 128-752.000.
Kotzin, Michael D.; Zdunek, Kenneth J.; and Ziolko, Eric F., to Motorola, Inc. Secure trunked communications system. 4,882,751, Cl. 380-9.000.
Koumura, Noboru: *See*—
Uzawa, Shunichi; Mori, Tetsuzo; and Koumura, Noboru, 4,882,776, Cl. 455-617.000.
Kovac, Caroline A.; Ledermann, Peter G.; and Nguyen, Luu T., to International Business Machines Corporation. Dam for lead encapsulation. 4,881,885, Cl. 425-121.000.
Kovarik, David P.: *See*—
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Kovitch, Frank J.; Reinhardt, Charles M.; and Sullivan, Paul E., to Lockheed Corporation. All welded sound isolation flexible connection. 4,881,759, Cl. 285-49.000.
Koyama, Junichi: *See*—
Fukui, Hiroshi; Namba, Ryujiro; Saito, Tsutomu; Ohtsu, Yutaka; Kimura, Asa; Nakano, Motokiyo; Nakata, Okitsugu; Tommita, Kenichi; Tokubo, Kazuo; Ohno, Kazuhisa; Yoneyama, Toshio; Ogawa, Takashi; Morohoshi, Hideo; Koyama, Junichi; Kanda, Taketoshi; Kawaguchi, Kunihiro; and Shimizu, Yuzo, 4,882,225, Cl. 428-405.000.
Koyama, Kazuya; and Yokoyama, Yoshimasa. Method for molding confectionery products. 4,882,176, Cl. 426-5.000.
Koyama, Mamoru, to Tokyo Metal Co., Ltd. Aluminum-ceramic complex material. 4,882,237, Cl. 428-699.000.
Kozuki, Susumu: *See*—
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Yasumura, Hiroto; Hirasawa, Masahide; Noji, Minoru; Kozuki, Susumu; Takahashi, Koji; and Yoshimura, Katsuji, 4,882,632, Cl. 358-330.000.
Kramer, Daniel P.; Santangelo, Joseph G.; and Weber, James J., to Air Products and Chemicals, Inc. CO_2 copolymer binder for forming ceramic bodies and a shaping process using the same. 4,882,110, Cl. 264-63.000.
Kramer, Donald D., to Circle K Enterprises, Inc. Tanning bed top cover actuator. 4,881,548, Cl. 128-376.000.
Krauland, Konrad L. Method and apparatus for braiding three-dimensional fabrics. 4,881,444, Cl. 87-8.000.
Kraus, Willibald, to TRW United Carr GmbH. Plastic holding element. 4,881,705, Cl. 248-74.200.
Krause, Hans: *See*—
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Kreiner, James G., to General Tire, Inc. Method for improving rubber cure rates. 4,882,394, Cl. 525-332.700.
Kress, Hans-Jurgen: *See*—
Wittmann, Dieter; Kress, Hans-Jurgen; Bottenbruch, Ludwig; Leitz, Edgar; and Peters, Horst, 4,882,381, Cl. 525-63.000.
Krizek, Milan: *See*—
Markert, Jurgen; Schubel, Klaus-Dieter; and Krizek, Milan, 4,881,402, Cl. 73-61.00R.
Krochta, Todd J.: *See*—
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Krone Aktiengesellschaft: *See*—
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Kronich, Peter G., to Tecumseh Products Company. Valve mechanism lubrication system for horizontal cylinder overhead valve engine. 4,881,496, Cl. 123-90.330.
Krstanovic, Srdjan: *See*—
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Kruit, Pieter, to U.S. Philips Corporation. Electron detection with energy discrimination. 4,882,486, Cl. 250-305.000.
Kruse, Lawrence I.; Ross, Stephen T.; and Ohlstein, Eliot H., to Smith-Kline Beckman Corporation. 2-(aminoalkylthio)imidazoles as dopamine-β-hydroxylase inhibitors. 4,882,348, Cl. 514-398.000.
Kryder, Mark H.; and Shieh, Han-Ping D., to Movid Information Technology, Inc. Single-head, direct overwrite magneto-optic system and method. 4,882,718, Cl. 369-13.000.
Krzyston, John: *See*—
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Kubo, Kazuhiro: *See*—
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Kubo, Masaaki: *See*—
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Kubo, Seitoku: *See*—
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Kubo, Takashige: *See*—
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Kubota, Kouhei: *See*—
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Kugler, Uwe H.: *See*—
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Kuliga, Thomas N.: *See*—
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Kumagai, Yasuaki: *See*—
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Kumasaka, Hideyuki; Takao, Kouji; and Kuriyama, Hiroshi, to Nissan Motor Co., Ltd. Vehicle structure, especially chassis frame structure. 4,881,756, Cl. 280-785.000.
Kunichika, Kenji: *See*—
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Kuwada, Kazuhiko: *See*—
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Kveglis, Albert A.; and Gruben, Arnold H., to Sun Chemical Corporation. Semi-polar hyperdispersants for pigment bases. 4,882,436, Cl. 548-354.000.
Kyle, Teresa M.; Meunier, Paul J.; and MacPherson, Edwin J., to Fiberglas Canada Inc. Process for manufacturing closed cell phenolic foams. 4,882,364, Cl. 521-136.000.
Kyocera Corporation: *See*—
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Kyougoku, Nobuo; and Harada, Hitoshi, to Suntory Limited. Food vessel using heating element for microwave oven. 4,882,463, Cl. 219-10.55E.

Kyser, Jerry L.; and Mears, David D. Toilet tissue alert system. 4,882,568, Cl. 340-568.000.

L. Schuler GmbH: *See*—
Daubner, Edmund; and Mikusch, Gerald, 4,881,398, Cl. 72-419.000.

La Minerva Di Chiodini Mario S.r.l.: *See*—
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La Physique Appliquee Industrie: *See*—
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Laganis, Evan D.; and West, Alden D., to Du Pont de Nemours, E. I., and Company. Infrared laser recording film. 4,882,265, Cl. 430-522.000.

Lai, Jan-Ji; Smith, Kevin M.; and McCaul, Bruce W., to Healux, Inc. Storage-stable porphin compositions and a method for their manufacture. 4,882,234, Cl. 514-185.000.

Lallement, Jacques: *See*—
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Lambert, Robert W.; Martin, Joseph A.; and Thomas, Gareth J., to Hoffmann-La Roche Inc. Pyrimidine derivatives. 4,882,316, Cl. 514-49.000.

Lambrechts, Frank M. P. Apparatus for processing textiles. 4,881,385, Cl. 68-29.000.

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Lang, Gordon R.; and Longstaff, Fred M., to Motorola Canada Limited. Full duplex modem system for differing data bit rates. 4,882,726, Cl. 370-24.000.

Lange, Edwin L., to Kenneth G. Kavanagh; and Edward I. Kavanagh. Security device. 4,881,768, Cl. 292-251.000.

Lange, Peter: *See*—
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Lanxide Technology Company, LP: *See*—
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Laporte Industries Limited: *See*—
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Laroche, Pierre, to Glaverbel. Articles of filled synthetic polymeric materials and glass bead filler therefore. 4,882,367, Cl. 523-212.000.

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Larsen, John M. Stringed instrument blocking system. 4,881,441, Cl. 84-291.000.

Laser Communications, Inc.: *See*—
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Latzko, Robert L.: *See*—
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Lavoine, Jean-Claude; and Guedaguian, Arsene, to Lavoine, Jean-Claude. Bathing device, in particular for bathing babies. 4,881,281, Cl. 4-572.000.

Law, Robert J.: *See*—
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Lebourg, Michel: *See*—
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Lecere, Oliver: *See*—
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Lee, Chi-Long: *See*—
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Lee, I Soo. Multi-phase bipolar brushless D.C. motor. 4,882,524, Cl. 318-254.000.

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Lee, Robert W.: *See*—
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Lee, So-Sun K. Cord or rod clamp. 4,881,302, Cl. 24-136.00R.

Lefevre, Herve; Rojas, Dominique; and Turpin, Marc, to Thomson-CSF. Optic fiber hydrophone and antenna associating a series of hydrophones. 4,882,716, Cl. 367-149.000.

Leger, Geary L.: *See*—
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Leigh, James P.; and Roethel, Henry G., to Meyer Company, The. Dispenser valve and method of forming the same. 4,881,669, Cl. 222-505.000.

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Lengen, Wilhelm; Oberfranz, Rudolf; and Puritz, Wolfgang, to Messerschmitt-Boelkow-Blohm GmbH. Robot system for forming a structural component of a preimpreganted fiber reinforced tape. 4,882,007, Cl. 156-523.000.

Leo Pharmaceutical Products Ltd. A/S: *See*—
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Leonard, John K.; and Fabry, Roland, to Pullman Canada Ltd. Apparatus and method for detecting the presence of a burner flame. 4,882,573, Cl. 340-578.000.

Leppek, Kevin G., to General Motors Corporation. ABS pressure apply algorithm. 4,881,784, Cl. 303-100.000.

Lerch, Ulrich; Henning, Rainer; and Kaiser, Joachim, to Hoechst Aktiengesellschaft. Alkoxyphenylindolinone derivatives, medicaments containing them and their use. 4,882,329, Cl. 514-253.000.

Lerman, Samuel I. Cardiac assist cuirass. 4,881,527, Cl. 128-30.200.

Les Laboratoires Meram: *See*—
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Lesikar, Fred C. Waterfall producing unit for use in swimming pools. 4,881,280, Cl. 4-507.000.

Leslie, Thomas M.; Yoon, Hyun N.; DeMartino, Ronald N.; and Stamatoff, James B., to Hoechst Celanese Corporation. Side chain liquid crystalline polymeric media exhibiting third order nonlinear optical response. 4,882,402, Cl. 526-243.000.

Lever Brothers Company: *See*—
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Levinson, Frank H., to Finisar Corporation. Integrated optical coupler and connector. 4,881,789, Cl. 350-96.150.

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Leybold Aktiengesellschaft: *See*—
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Liautaud, John R. Self contained eye wash fountain. 4,881,283, Cl. 4-620.000.

Liaw, J. Y., to Li'l Mort Sales. Dinosaur egg. 4,881,915, Cl. 446-153.000.

Libbey-Owens-Ford Co.: *See*—
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Linde Aktiengesellschaft: *See—*
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Lindman, Richard S.; Lindman, Richard P.; and Myers, Edward D. Computer security system. 4,882,752, Cl. 380-25.000.

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Linnemann, Kent A., to Shippers Paper Products Company. Paperboard container for shipping material in bulk. 4,881,683, Cl. 229-117.010.

Lippmann, Raymond; and Schnars, Michael J., to Delco Electronics Corporation. Electronic range indicator for a motor vehicle. 4,882,572, Cl. 340-456.000.

Lippuner, Christian; and Baltensperger, Werner, to Gebrueder Buehler AG. Method for setting the grinding rollers in roller frames of a flour milling plant, as well as flour milling plant for performing the method. 4,881,689, Cl. 241-9.000.

Liska, Georg, to Zahnradfabrik Friedrichshafen, AG. Radial piston pump. 4,881,877, Cl. 417-270.000.

Liu, Jonq-Min; Chen, Tai-Jun; Tsai, Lii-Chyuan; and Pai, Li-Wen, to Industrial Technology Research Institute. Copper phthalocyanine photoreceptor and method for producing the same. 4,882,250, Cl. 430-58.000.

Liu, Yung S.; and Grubb, Willard T., to General Electric Company. Method for photopatterning metallization via UV-laser ablation of the activator. 4,882,200, Cl. 427-53.100.

Liverance, Martin K.; McMahan, David R.; and Haydu, Bartly A., to General Motors Corporation. Headlamp assembly. 4,882,660, Cl. 362-226.000.

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Loutfy, Rafik O.; Hor, Ah-Mee; Liebermann, George; Toth, Alan J; Hsiao, Cheng-Kuo; Carmichael, Kathleen M.; and Tokoli, Emery G., to Xerox Corporation. Photoconductive imaging members with mixtures of photogenerator pigment compositions. 4,882,254, Cl. 430-59.000.

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Luce, David A.; and Krstanovic, Srdjan, to Cambridge Instruments, Inc. Optical alignment system. 4,881,807, Cl. 351-208.000.

Luckhoff, Peter, to Reinhardt Technik GmbH & Co. Method of and device for proportioning at least one viscous substance. 4,881,820, Cl. 366-142.000.

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Luther, LeRoy D., to Triangle Tool Corporation. Mold side wall locking apparatus. 4,881,891, Cl. 425-556.000.

Lutze, Hans; and Zeidler, Falk, to Mercedes-Benz AG. Safety device for the occupant of the central rear seat position in a motor vehicle. 4,881,754, Cl. 280-728.000.

Luukkala, Mauri; Matilainen, Aarre; and Viirto, Jarmo, to Soundek Oy. Fiber-optic detector for oils and solvents. 4,882,499, Cl. 250-577.000.

Lyga, Thomas M.; and Ryckman, William D., Jr., to Black & Decker, Inc. Low-headroom popcorn popper. 4,881,457, Cl. 99-323.500.

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Machida, Takashi; Miyake, Kou; Fujisaki, Hirotaka; and Mouri, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Stabilized transmitter. 4,882,767, Cl. 455-117.000.

Mackanic, James C.; Lelko, Dawn M.; Shugart, Steven A.; and Koch, James K., to Helwett-Packard Company. Method for obtaining electrical interconnect using a solderable mechanical fastener. 4,881,906, Cl. 439-83.000.

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Madsen, Harold L. Drapery hanger and manipulator. 4,881,588, Cl. 160-345.000.

Maeda, Hirokazu; Yamaguchi, Mayumi; Uchiyama, Tetsuya; Baba, Hideki; Matsunami, Hidenobu; Ebihara, Yoshitaka; and Kanegae, Junji, to Fuji Oil Company, Limited. Hard butter composition. 4,882,192, Cl. 426-607.000.

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Maezawa, Akihiko; Nakajima, Yoshio; Kaneko, Mitsuyoshi; and Aoki, Shinji, to Ebara Corporation. Process for treating effluent gas. 4,882,020, Cl. 204-157.300.

Maguire, Joel M., to General Motors Corporation. Anti-lash gear mechanism. 4,881,422, Cl. 74-440.000.

Maher, Caleb H.; and Corah, Susan E., to Sprague Electric Company. Magnesium titanate ceramic and dual dielectric substrate using same. 4,882,650, Cl. 361-321.000.

Maher, Galeb H., to Sprague Electric Company. Monolithic compound-ceramic capacitor. 4,882,651, Cl. 361-321.000.

Mahmoud, M. Fatein, to American Telephone and Telegraph; and AT&T Bell Laboratories. Multi-location video conference system. 4,882,743, Cl. 379-53.000.

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Maki, Hirohisa; and Suzuki, Eiichiro, to Dai-Ichi Kogyo Seiyaku Co., Ltd. Process for producing shaped articles from vegetable particulate materials. 4,882,112, Cl. 264-109.000.

Makino, Shoso: *See*—
Ono, Akira; Fuse, Toshikazu; Miyamoto, Osamu; Makino, Shoso; Yamato, Yoshihisa; Kametani, Hiroshi; Tokura, Susumu; Tanaka, Hiromi; Ito, Toru; Nakao, Hitomi; Tokuoka, Shuji; and Takeda, Toshihide, 4,882,220, Cl. 428-240.000.

Malabarba, Adriano; Strazzolini, Paolo; and Cavalleri, Bruno, to Gruppo Lepetit S.p.A. Process for preparing antibiotic L 17392 (deglucoteicoplanin). 4,882,419, Cl. 530-317.000.

Mallinson, Stephen R.; and Millar, Colin A., to British Telecommunications Public Limited Company. Optical device. 4,881,791, Cl. 350-96.190.

Maloney, Michael O., to Streck, Donald A., a part interest. Audio microphone system with digital output and volume control feedback input. 4,882,773, Cl. 455-617.000.

Man Gutehoffnungshuette GmbH: *See*—
Henneken, Bernhard; Kammerling, Burno; Scholz, Eckhard-K.; Schroeder, Wolfgang; and Krause, Hans, 4,881,869, Cl. 414-786.000.

Manabe, Daisuke, to Nippon Electric Co., Ltd. Color filter for a solid state imaging device. 4,882,616, Cl. 358-44.000.

Manable, Koichi; Naka, Mitsumura; and Futamura, Mitsushi, to Sumitomo Chemical Company, Ltd.; and Nippon Aluminum Manufacturing Company, Ltd., The. Floss separating apparatus and method. 4,882,042, Cl. 209-138.000.

Mandoh, Ritsuo: *See*—
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Manley, Jack, to Robbins, Edward S., III. Fence post and web connection system. 4,881,721, Cl. 256-52.000.

Manley, Thomas L., Jr.: *See*—
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Manlove, Gregory J.: *See*—
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Mann, Gamdur S., to General Motors Corporation. Extended life spark plug/igniter. 4,881,913, Cl. 445-7.000.

Mannesmann AG: *See*—
Lohrmann, Gerhard; Engelhardt, Guenter; and Werner, Thomas, 4,881,838, Cl. 400-662.000.

Manrubia, Robert. Frame stabilizing apparatus. 4,881,333, Cl. 40-152.100.

Mantegani, Sergio: *See*—
Chiodini, Laura; Gobbini, Mauro; Mantegani, Sergio; Ruggieri, Daniel; Temperilli, Aldemio; Traquandi, Gabriella; and Ferrari, Patrizia, 4,882,315, Cl. 514-26.000.

Marazza, Renzo: *See*—
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Marburg, Stephen; Kniskern, Peter J.; and Tolman, Richard L., to Merck & Co., Inc. Covalently-modified bacterial polysaccharides, stable covalent conjugates of such polysaccharides and immunogenic proteins with bigeneric spacers and methods of preparing such polysaccharides and conjugataes and of confirming covalency. 4,882,317, Cl. 514-54.000.

Marchand, Pierre: *See*—
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Mendenhall, David W.; Marian, Steve P.; Goff, Jay T.; Cotter, Neil J.; and Corbesero, Steve R., 4,881,901, Cl. 439-65.000.

Marinoni, Mario, to Casma S.p.A. Variable hinge for a door or window. 4,881,296, Cl. 16-237.000.

Mario, Petrin; and Blaise, Petrin. Ski repairing machine. 4,881,347, Cl. 51-5.00R.

Markert, Jurgen; Schubel, Klaus-Dieter; and Krizek, Milan, to Huels Aktiengsellschaft. Process for the determination of liquid absorption of powdery solids. 4,881,402, Cl. 73-61.00R.

Marks, Alvin M.; and Diamandis, Peter H. Space train. 4,881,446, Cl. 89-8.000.

Maron, Antonina: *See*—
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Marquette Electronics: *See*—
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Marrah, Jeffrey J.; Manlove, Gregory J.; and Kennedy, Richard A., to Delco Electronics Corporation. Low distortion current mirror. 4,882,548, Cl. 330-288.000.

Martin, Bernard E.: *See*—
Holderfield, Daron C.; Martin, Bernard E.; and Russell, Samuel S., 4,881,411, Cl. 73-856.000.

Martin, Glenn E.: *See*—
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Martin, Joseph A.: *See*—
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Martin, Richard H., to P. H. Glatfelter Company. Smoking article wrapper and method of making same. 4,881,557, Cl. 131-365.000.

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Martinez, Abelardo: *See*—
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Martinez, Alberto: *See*—
Alfon, Jose ; Martinez, Alberto; and Martinez, Abelardo, 4,881,389, Cl. 70-209.000.

Martinez, Antonio, to Argo Instruments Inc. Vehicle and distress indicator therefor. 4,882,570, Cl. 340-574.000.

Martini, M. Vey. Quickly adjustable stirrup buckle. 4,881,303, Cl. 24-170.000.

Marugama, Kazuo; Horie, Kiyoshi; Noami, Tsuneo; Yamamoto, Toshiro; Adachi, Koji; Okamoto, Toru; Sumikawa, Takeshi; and Nobumasa, Furuya, to Fuji Xerox Co., Ltd. Electrophotographic image recording method. 4,882,247, Cl. 430-45.000.

Maruma Jyusharyo Kabushiki Kaisha: *See*—
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Marusan Co., Ltd.: *See*—
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Maruyama, Akio; Sakakibara, Teigo; and Hashimoto, Yuichi, to Canon Kabushiki Kaisha. Electrophotographic device. 4,882,257, Cl. 430-100.000.

Maruyama, Kazumasa; Kaneko, Tatsushi; and Chiba, Tohru, to Shin-Etsu Chemical Co., Ltd. Electroluminescent composition containing organopolysiloxane and electroluminescent device usable as a backlighting unit for liquid crystal display. 4,882,517, Cl. 313-502.000.

Maruyama, Tsutomu; Matsumoto, Hidetoshi; and Miyake, Yoshiyuki, to Asahi Glass Company, Ltd. Glass capillary tube and method for its production. 4,882,209, Cl. 428-34.100.

Marzinotto, Francesco; and Junghans, Jurgen, to Ciba-Geigy AG. Method and apparatus for transporting perforated objects. 4,881,770, Cl. 294-64.100.

Masai, Tadahisa: *See*—
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Masaki, Kenji: *See*—
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Massaux, Jean; Lambert, Pierre; and Noiret, Jacques, to Colgate-Palmolive Co. Granulated magnesium monoperoxyphthalate coated with fatty acid for prevention of dye damage of bleach sensitive fabrics. 4,881,940, Cl. 8-111.000.

Masumoto, Takahiko, to Sanyo Electric Co., Ltd. Method of and apparatus for motion vector compensation in receiving television signal based on muse system. 4,882,613, Cl. 358-37.000.

Matayoshi, Yutaka; and Kamegaya, Shigeru, to Nissan Motor Co., Ltd. Valve operating system for internal combustion engine. 4,881,497, Cl. 123-90.340.

Mathewson, Wilfred F.: *See*—
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Matilainen, Aarre: *See*—
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Matsubara, Shunsuke: *See*—
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Matsubara, Yasushi; Miyagawa, Minoru; and Takahashi, Masanori, to Tohoku Dotetsu Kabushiki Kaisha. Durable epoxy resin paint composition. 4,882,371, Cl. 523-406.000.

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Matsudaira, Takeo; and Suzuki, Hisanori, to Hoya Corporation. Method for depositing a lubricant layer to manufacture a magnetic recording medium. 4,882,197, Cl. 427-8.000.

Matsui, Hiroshi: *See*—
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Matsui, Minoru; and Takahashi, Tomonori, to NGK Insulators, Ltd. Process of preparing zirconia-coated silicon nitride sintered member. 4,882,109, Cl. 264-62.000.

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Matsuoka, Mikiharu; Yamada, Yasuhiro; Miyazaki, Yasuko; Kanemoto, Takashi; Katayama, Hirohiko; and Ikuta, Tamao, to Canon Kabushiki Kaisha. Sensing display apparatus of image pattern. 4,881,900, Cl. 434-113.000.

Matsuoka, Noriyuki; and Kubo, Masaaki, to Yamaichi Electric Mfg. Co., Ltd. IC carrier. 4,881,639, Cl. 206-328.000.

Matsushita Electric Industrial Co., Ltd.: *See*—
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Matsushita, Masao: *See*—
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Matsuura, Ryo; Isobe, Nobuyuki; and Kase, Masao, to Pioneer Electronic Corporation. Front loading disk player. 4,882,722, Cl. 369-75.200.

Matsuura, Tooru; and Narita, Yoshinori, to NGK Spark Plug Co., Ltd. Rocker arm made of ceramics. 4,881,498, Cl. 123-90.390.

Matsuyama, Kikuma: *See*—
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Matthiesen, Sharon: *See*—
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Mattingly, Bruce W.; and Coates, Roger J., to Soltech, Inc. Water heater package construction and method. 4,881,641, Cl. 206-320.000.

Mattiola, Paul A.; and Van Ommeren, James, to Air Products and Chemicals, Inc. Automated cylinder transfill system and method. 4,881,374, Cl. 62-50.600.

Mattiola, Paul A.; and VanOmmeren, James, to Air Products and Chemicals, Inc. Automated cylinder transfill system and method. 4,881,375, Cl. 62-50.600.

Maurer, Donald D.: *See*—
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Maurer, Fritz; Becker, Benedikt; and Homeyer, Bernhard, to Bayer Aktiengesellschaft. Pesticidal pyrimidinyl (thiono)(thio)-phosphates. 4,882,320, Cl. 514-86.000.

Maurer, Fritz; Sommer, Herbert; Behrenz, Wolfgang; Homeyer, Bernhard; and Stendel, Wilhelm, to Bayer Aktiengesellschaft. Thionophosphonic acid ester arthropodicides. 4,882,321, Cl. 514-86.000.

Mauritz, Karl H.; Leger, Geary L.; Wicklund, Joseph B.; Herrud, James E.; and Laney, Steven H., to Micron Technology, Inc. Switched memory module. 4,882,700, Cl. 365-51.000.

Mawla, Khalid A., to International Business Machines. Dual flux path voice coil motor. 4,882,508, Cl. 310-13.000.

Max-Planck Gesellschaft zur Forderung der Wissenschafter e.V.: *See*—
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Maxson, Myron T.: *See*—
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Maxwell, Linden G.: *See*—
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Maxwell, Ray F.; and White, Robert D. Data transmission system. 4,882,765, Cl. 455-18.000.

May, Barry A.; and Armstrong, James, to Tennant Trend Inc. Center feed dispenser for cleaning solution. 4,881,288, Cl. 15-98.000.

May, Heinz, to Leybold Aktiengesellschaft. Sterilizing device for a freeze-drying apparatus. 4,881,326, Cl. 34-92.000.

Mazda Motor Corporation: *See*—
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MB Group plc: *See*—
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McCann, Larry D.: *See*—
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McDougall, David W.: *See*—
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McGaughan, Thomas. Disposable aerosol razor. 4,881,323, Cl. 30-41.000.

McGinley, Jeremiah E., to General Electric Company. High velocity sabot for spin stabilized penetrator. 4,881,466, Cl. 102-522.000.

McGlynn, Kevin: *See*—
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McGuire, Michael L. Suspended flexible membrane storage silo and article dispenser. 4,881,665, Cl. 222-181.000.

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McIntyre, Timothy J.; and Greig, Walter G., to Moore Business Forms, Inc. Paper products with receptive coating for repositionable adhesive and methods of making the products. 4,882,211, Cl. 428-40.000.

McKay, Alan R. Moveable roadway barrier system. 4,881,845, Cl. 404-6.000.

McKereghan, Kate N.: *See*—
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McLachlan, Alan: *See*—
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McLaughlin, William; Lee, Doug; and Garcia, Ricardo, to AVX Corporation. Method of terminating lead filled capacitor. 4,881,308, Cl. 29-25.420.

McMahan, David R.: *See*—
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McMahan, Michael L.: *See*—
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McMillan, Kenneth: *See*—
Simon, Jaime; Garlich, Joseph R.; Wilson, David A.; and McMillan, Kenneth, 4,882,142, Cl. 424-1.220.

McMillen, Ronald R.; and Anderley, John J., to Wagner Spray Tech Corporation. Method of molding a label on an electrical cord. 4,882,116, Cl. 264-254.000.

McMillin Wire & Plating, Inc.: *See*—
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McNamee, Adrian G.: *See—*
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Mead Corporation, The: *See—*
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Meade, Paula A.: *See—*
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Mears, David D.: *See—*
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Measurement Resources Inc.: *See—*
Heyman, Joseph S., 4,881,552, Cl. 128-774.000.

Medianik, Anatoly. Fishing rod holder. 4,881,674, Cl. 224-311.000.

Medical Engineering Corporation: *See—*
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Medice Chem.-Pharm. Fabrik: *See—*
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Medin, Gunnar; Olsson, Erik; Sjoo , Lennart; and Lundgren, Roger, to Affarsverket FFV. Reactive armor arrangement. 4,881,448, Cl. 89-36.020.

Megarry, Thomas J., to Short Brothers PLC. Method and apparatus for molding fiber reinforced resin matrix composite material. 4,882,118, Cl. 264-510.000.

Mehl, Donald N. Method of lining bait. 4,881,337, Cl. 43-4.000.

Mehta, Vinay, to Hunter-Melnor, Inc. Temperature recovery display device for an electronic programmable thermostat. 4,881,686, Cl. 236-46.00R.

Meier, Hermann, to Berndorf Luzern AG. Apparatus for cooling, storing and inductively reheating complete meals. 4,881,590, Cl. 165-48.100.

Mekalanos, John J., to President and Fellows of Harvard College. Non-toxinogenic vibrio cholerae mutants. 4,882,278, Cl. 435-172.300.

Mellini, John D. Metallic lantern mantle. 4,881,893, Cl. 431-100.000.

Melotti, Angelo R.: *See—*
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Melton, Jack T.: *See—*
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Menard, Edward J.: *See—*
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Mendenhall, David W.; Marian, Steve P.; Goff, Jay T.; Cotter, Neil J.; and Corbesero, Steve R., to Augat Inc. High density backplane connector. 4,881,901, Cl. 439-65.000.

Menendez, Rogelio; and Gorelick, Kenneth J., to Fisons Corporation. Method of treatment. 4,882,170, Cl. 424-600.000.

Mengal, Manfred: *See—*
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Menzies, L. William, Jr.; and Menzies, Stephen W. Surface mounted decoupling capacitor. 4,882,656, Cl. 361-393.000.

Menzies, Stephen W.: *See—*
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Merck & Co., Inc.: *See—*
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Merck Patent Gesellschaft Mit Beschrankter Haftung: *See—*
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Eidenschink, Rudolf; Krause, Joachim; Hittich, Reinhard; Poetsch, Eike; Scheuble, Bernhard; Weber, Georg; and Pohl, Ludwig, 4,882,082, Cl. 252-299.610.

Merit Industries, Inc.: *See—*
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Merrell Dow Pharmaceuticals Inc.: *See—*
Johnston, J. O'Neal; and Holbert, Gene W., 4,882,322, Cl. 514-178.000.

Merson, Richard L.: *See—*
Sawada, Hiroshi; and Merson, Richard L., 4,882,188, Cl. 426-438.000.

Mertens, Alfred: *See—*
von der Saal, Wolfgang; Holck, Jens-Peter; Mertens, Alfred; Muller-Beckmann, Bernd; and Kling, Lothar, 4,882,342, Cl. 514-338.000.

Mertens, Theobald, to General Motors Corporation. Horn operating means for a motor vehicle steering wheel having two contact plates solely separated by a foam sheet and contactable at spaced points with substantially uniform pressure. 4,882,460, Cl. 200-512.000.

Messerschmitt-Boelkow-Blohm GmbH: *See—*
Hofrichter, Gerhard, 4,881,704, Cl. 244-213.000.
Lengen, Wilhelm; Oberfranz, Rudolf; and Puritz, Wolfgang, 4,882,007, Cl. 156-523.000.
Moeller, Werner; and Ulmann, Andreas, 4,882,298, Cl. 437-212.000.

Mestais, Corinne: *See—*
Bonnefoy-Claudet, Jean-Paul; and Mestais, Corinne, 4,882,680, Cl. 364-413.240.

Metcalf, Brian W.: *See—*
Holt, Dennis A.; Levy, Mark A.; and Metcalf, Brian W., 4,882,319, Cl. 514-119.000.

Metevia, Virgil L.: *See—*
Sweet, Randall P.; Miller, Patrick J.; and Metevia, Virgil L., 4,882,377, Cl. 524-267.000.

Meunier, Paul J.: *See—*
Kyle, Teresa M.; Meunier, Paul J.; and MacPherson, Edwin J., 4,882,364, Cl. 521-136.000.

Meusy, Andre . Method for activating the combustion in a heating apparatus using solid fuel, and chimney for implementing such method. 4,881,522, Cl. 126-540.000.

Meyer Company, The: *See—*
Kawolics, Raymond P., 4,881,664, Cl. 222-153.000.
Leigh, James P.; and Roethel, Henry G., 4,881,669, Cl. 222-505.000.

Meyer, Hans: *See—*
Butikofer, Jurg; and Meyer, Hans, 4,881,872, Cl. 415-143.000.

Meyer, Hans U. Capacitive detector of position having electrodes and circuitry formed on a common integrated circuit. 4,882,536, Cl. 324-61.00R.

Meyer, Norbert: *See—*
Saupe, Thomas; Klebe, Gerhard; Schirmer, Ulrich; Paul, Gerhard; Kober, Reiner; Wuerzer, Bruno; Berghaus, Rainer; Meyer, Norbert; and Westphalen, Karl-Otto, 4,881,969, Cl. 71-94.000.

Meyer Plastics, Inc.: *See—*
Glines, James A., 4,881,386, Cl. 70-19.000.

Meyer, Stefan M.: *See—*
Simelunas, William J.; Polifroni, Nicholas R.; Shoiket, Henry N.; and Meyer, Stefan M., 4,882,185, Cl. 426-283.000.

Meyer, Willy: *See—*
Fory, Werner; and Meyer, Willy, 4,881,964, Cl. 71-91.000.

Meyerhoefer, Carl, to Porta Systems Corp. Homologated protector modules for telephone connector blocks. 4,882,748, Cl. 379-332.000.

Michika, David; and Brown, Robert J., to Ford Aerospace Corporation. Single-aperture multi-spectral reticle projector. 4,881,796, Cl. 350-166.000.

Michimoto, Takashi; Kudo, Saburo; Kuwada, Kazuhiko; and Ishida, Nobuyoshi, to Babcock-Hitachi Kabushiki Kaisha. System for continuously producing plate-shaped catalysts. 4,881,883, Cl. 425-89.000.

Microelectronics and Computer Technology Corporation: *See—*
Nelson, Richard D.; Gupta, Omkarnath R.; and Herrell, Dennis J., 4,882,654, Cl. 361-382.000.

Micron Technology, Inc.: *See—*
Chhabra, Navjot, 4,882,028, Cl. 204-298.000.
Mauritz, Karl H.; Leger, Geary L.; Wicklund, Joseph B.; Herrud, James E.; and Laney, Steven H., 4,882,700, Cl. 365-51.000.
Moore, Scott E., 4,881,487, Cl. 116-227.000.

Mida S.r.l.: *See—*
Vanoni, Carlo, 4,881,462, Cl. 101-292.000.

Midwest Instrument Co., Inc.: *See—*
Falk, Richard A.; and Colzani, James, 4,881,824, Cl. 374-140.000.

Mieno, Toshiyuki; Nakajima, Toyohei; and Nagao, Akira, to Honda Giken Kogyo Kabushiki Kaisha. Control system for ignition timing and boost pressure in internal combustion engine. 4,882,695, Cl. 364-431.080.

Miki, Ichiro: *See—*
Oshima, Etsuo; Obase, Hiroyuki; Karasawa, Akira; Kubo, Kazuhiro; Miki, Ichiro; and Ishii, Akio, 4,882,351, Cl. 514-431.000.

Miki, Masayuki: *See—*
Suzuki, Seikoo; Miki, Masayuki; Sasayama, Takao; Osuga, Minoru; and Oyama, Yoshishige, 4,882,030, Cl. 204-406.000.

Mikita, Hiroshi: *See—*
Maeno, Yoshinori; Mikita, Hiroshi; Umezu, Sadao; Matsuda, Fukuhisa; and Ushio, Masao, 4,882,519, Cl. 313-633.000.

Mikulski, Stanislaw M.: *See—*
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Mikusch, Gerald: *See—*
Daubner, Edmund; and Mikusch, Gerald, 4,881,398, Cl. 72-419.000.

Milich, David R.: *See—*
Thornton, George B.; Moriarty, Ann M.; Milich, David R.; and McLachlan, Alan, 4,882,145, Cl. 424-88.000.

Millar, Colin A.: *See—*
Mallinson, Stephen R.; and Millar, Colin A., 4,881,791, Cl. 350-96.190.

Miller, Charles A.: *See—*
Haddock, John T.; Miller, Charles A.; Moist, Stanford C., Jr.; Nauman, Warren D.; and Pala, Ronald S., 4,881,911, Cl. 439-484.000.

Miller, Fredrick O.: *See—*
Chumley, Dexter W.; and Miller, Fredrick O., 4,881,656, Cl. 220-270.000.

Miller, Harris: *See—*
Kim, Hongzoon; Saunders, Edward C.; and Miller, Harris, 4,882,264, Cl. 430-467.000.

Miller, James E.: *See—*
Bikson, Benjamin; Miller, James E.; and Nelson, Joyce K., 4,881,954, Cl. 55-16.000.

Miller, Patrick J.: *See—*
Sweet, Randall P.; Miller, Patrick J.; and Metevia, Virgil L., 4,882,377, Cl. 524-267.000.

Miller, Phillip; Shindley, Richard P.; Feltz, Kristi T.; Hanson, George E.; and White, Jonathan R., to PAR Microsystems, Inc. Synthesized speech-facilitated product preparation and/or delivery system and method. 4,882,475, Cl. 235-383.000.

Mimoun, Nancy; and Zinbarg, Benson, to Sun Hill Industries, Inc. Rotatable organizer with integral pivot nub and peripheral reduced area contact nubs. 4,881,651, Cl. 220-18.000.
Mimura, Yoshiki: *See—*
Suzuki, Shinji; Arai, Tetsuji; Ueki, Kazuyoshi; Mimura, Yoshiki; and Suzuki, Hiroko, 4,882,263, Cl. 430-328.000.
Minagawa, Hidenobu: *See—*
Tatsumi, Yuuichi; Minagawa, Hidenobu; Iwahashi, Hiroshi; Asano, Masamichi; and Imai, Mizuho, 4,882,507, Cl. 307-443.000.
Minakuchi, Akihiro, to Oki Electric Industry Co., Ltd. Character display device. 4,882,578, Cl. 340-750.000.
Mine, Kazunori; Murakami, Keisuke; and Urata, Hiromasa, to Tokyo Electric Co., Ltd. Image reading device. 4,882,631, Cl. 358-471.000.
Minnesota Mining and Manufacturing Company: *See—*
Grimmer, Derrick P.; and Wenz, Robert P., 4,882,239, Cl. 429-7.000.
Jordan, Robert C.; and Portelli, Gene B., 4,882,370, Cl. 523-215.000.
Kolb, Robert E., 4,882,390, Cl. 525-326.300.
Monroe, Larry D.; and Wood, William P., 4,881,951, Cl. 51-309.000.
Minolta Camera Kabushiki Kaisha: *See—*
Kato, Akio; Hamano, Hiroaki; and Ito, Hideo, 4,882,604, Cl. 355-201.000.
Osawa, Izumi; Iino, Syuji; Hotomi, Hideo; Masaki, Kenji; and Doi, Isao, 4,882,256, Cl. 430-66.000.
Sakamoto, Masashi, 4,882,605, Cl. 355-215.000.
Sakata, Toshio, 4,882,603, Cl. 355-75.000.
Tanaka, Yoshihiro; Tsuji, Sadafusa; Hata, Yoshiaki; Inoue, Manabu; Ootsuka, Hiroshi; Iwata, Michihiro; Ishito, Fumiaki; and Hayama, Koh, 4,882,602, Cl. 354-457.000.
Taniguchi, Nishinomiya; Ishida, Tokuji; Norita, Toshio; Hamada, Masataka; and Karasaki, Toshihiko, 4,882,601, Cl. 354-407.000.
Mista, Kresimir, to Karl Mayer Textilmaschinenfabrik GmbH. Spooling machine with a plurality of winding heads. 4,881,693, Cl. 242-35.50A.
Mita Industrial Co., Ltd.: *See—*
Deguchi, Hiroyuki, 4,882,606, Cl. 355-274.000.
Kato, Yoshiaki; Tanaka, Masashi; Tsujita, Mitsuji; Kimoto, Keizo; Nishikawa, Hirotsugu; and Kawaguchi, Mika, 4,882,253, Cl. 430-59.000.
Mitaka Kohki Company Ltd.: *See—*
Nakamura, Katushige, 4,881,709, Cl. 248-281.100.
Mito, Jun: *See—*
Kitami, Tetsu; and Mito, Jun, 4,881,576, Cl. 138-125.000.
Mitsubishi Chemical Industries Limited: *See—*
Irie, Masahiro, 4,882,428, Cl. 540-121.000.
Mitsubishi Denki Kabushiki Kaisha: *See—*
Doi, Makoto; Nakajima, Hiroyukio; Miyamoto, Fumiyuki; Oka, Seiji; and Nonogaki, Mitsuhiro, 4,882,389, Cl. 525-310.000.
Fujii, Hiroshi; Iio, Tsukasa; Genba, Yasusi; Moriwaki, Hideaki; and Mochizuki, Yoshinori, 4,882,556, Cl. 335-8.000.
Isozumi, Shuzoo, 4,881,416, Cl. 74-7.00A.
Komori, Shinji; Takata, Hidehiro; Tamura, Toshiyuki; and Asai, Fumiyasu, 4,882,704, Cl. 364-900.000.
Onishi, Ken; and Sugiyama, Kazuhiro, 4,882,638, Cl. 360-32.000.
Sanai, Yukiharu, 4,882,635, Cl. 360-10.200.
Sengoku, Masaharu, 4,882,720, Cl. 369-47.000.
Takasuka, Koji; and Ibuki, Koji, 4,882,682, Cl. 364-507.000.
Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See—*
Hiramatsu, Takeo, 4,881,626, Cl. 192-60.000.
Kono, Yoichiro; Kumagai, Yasuaki; Takeda, Nobuaki; and Ogita, Hiroshi, 4,881,959, Cl. 55-267.000.
Mitsubishi Kasei Corporation: *See—*
Nishimura, Tetsuhiko; Basu, Swapan K.; Chida, Yukio; Oguri, Yasuo; and Inoue, Shoko, 4,882,078, Cl. 252-629.000.
Mitsubishi Kinzoku Kabushiki Kaisha: *See—*
Takeda, Yoshinobu; and Yamamoto, Kunio, 4,882,117, Cl. 264-328.900.
Yato, Tadao; Onoue, Takeshi; and Tanaka, Hiroshi, 4,882,100, Cl. 264-0.500.
Mitsubishi Paper Mills, Ltd.: *See—*
Yamada, Jun; and Eguchi, Hiromi, 4,882,248, Cl. 430-49.000.
Mitsubishi Pencil Co., Ltd.: *See—*
Kawakubo, Takamasa; Yoshida, Mitsuru; and Suda, Yoshihisa, 4,882,102, Cl. 264-29.300.
Kawakubo, Takamasa; Yoshida, Mitsuru; and Suda, Yoshihisa, 4,882,103, Cl. 264-29.500.
Mitsubishi Petrochemical Co., Ltd.: *See—*
Nakajima, Yoshio; Kimura, Takao; and Nagaoka, Yoshinobu, 4,882,108, Cl. 264-54.000.
Mitsui, Isamu: *See—*
Taguchi, Fumiaki; Mitsui, Isamu; Hara, Kinichi; Hayashi, Masaro; Ezawa, Kunio; Fukunaga, Kenichi; and Kuranari, Jun, 4,882,423, Cl. 530-380.000.
Mitsui Mining & Smelting Co., Ltd.: *See—*
Okada, Atsuyuki; Kubota, Kouhei; Satoh, Tsutomu; Gotoh, Hiroshi; and Oziro, Takeshi, 4,882,126, Cl. 420-516.000.
Mitsuishi, Akio; Nakazawa, Yasuhiko; and Sato, Takumi, to Seiko Epson Corporation. Print wire driving device for wire type dot printer. 4,881,832, Cl. 400-124.000.
Miura, Makoto; Miyamoto, Kazuki; and Ishida, Masato, to Canon Kabushiki Kaisha. Multi computer fail safe control apparatus. 4,882,669, Cl. 364-184.000.
Miyabe, Masanori: *See—*
Kohara, Hidekatsu; Tokutake, Nobuo; Miyabe, Masanori; Nakayama, Toshimasa; Asaumi, Shingo; Tanaka, Hatsuyuki; and Arai, Yoshiaki, 4,882,260, Cl. 430-191.000.
Miyagawa, Minoru: *See—*
Matsubara, Yasushi; Miyagawa, Minoru; and Takahashi, Masanori, 4,882,371, Cl. 523-406.000.
Miyahara, Masahiko: *See—*
Setaka, Yousuke; Yanase, Sumio; Takeuchi, Kanji; and Miyahara, Masahiko, 4,881,414, Cl. 73-862.330.
Miyahira, Ronald T.; and Fasen, Kenneth, to H. M. Electronics, Inc. Wireless optical communication system. 4,882,770, Cl. 455-603.000.
Miyakawa, Hideaki: *See—*
Seki, Mitsuaki; Watanabe, Satoshi; and Miyakawa, Hideaki, 4,881,833, Cl. 400-185.000.
Miyakawa, Yoshitaka: *See—*
Horiuchi, Makota; Shimizu, Atsushi; Miyakawa, Yoshitaka; and Sakurai, Kazuya, 4,881,449, Cl. 91-372.000.
Miyake, Katsumi: *See—*
Aoki, Shigeo; Miyake, Katsumi; and Ugai, Yasuhiro, 4,881,797, Cl. 350-339.00F.
Miyake, Kiyoshi: *See—*
Kabune, Hideki; Kamiya, Kohji; Miyake, Kiyoshi; Saito, Shigeru; Yamada, Shinichi; and Asami, Ken, 4,882,530, Cl. 318-696.000.
Miyake, Kou: *See—*
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Miyake, Yoshiyuki: *See—*
Maruyama, Tsutomu; Matsumoto, Hidetoshi; and Miyake, Yoshiyuki, 4,882,209, Cl. 428-34.100.
Miyamoto, Fumiyuki: *See—*
Doi, Makoto; Nakajima, Hiroyukio; Miyamoto, Fumiyuki; Oka, Seiji; and Nonogaki, Mitsuhiro, 4,882,389, Cl. 525-310.000.
Miyamoto, Kazuki: *See—*
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Miyamoto, Naooki: *See—*
Kawamura, Takao; Miyamoto, Naooki; Ito, Hiroshi; Takemura, Hitoshi; Ohkawa, Kazumasa; and Ishibitsu, Kokichi, 4,882,252, Cl. 430-58.000.
Miyamoto, Osamu: *See—*
Ono, Akira; Fuse, Toshikazu; Miyamoto, Osamu; Makino, Shoso; Yamato, Yoshihisa; Kametani, Hiroshi; Tokura, Susumu; Tanaka, Hiromi; Ito, Toru; Nakao, Hitomi; Tokuoka, Shuji; and Takeda, Toshihide, 4,882,220, Cl. 428-240.000.
Miyata, Mitsuto: *See—*
Isobe, Shinichi; Miyata, Mitsuto; and Yamauchi, Takashi, 4,882,670, Cl. 364-188.000.
Miyazaki, Yasuko: *See—*
Matsuoka, Mikiharu; Yamada, Yasuhiro; Miyazaki, Yasuko; Kanemoto, Takashi; Katayama, Hirohiko; and Ikuta, Tamao, 4,881,900, Cl. 434-113.000.
Miyazawa, Kazutoshi: *See—*
Ohno, Kouji; Saito, Shinichi; Miyazawa, Kazutoshi; Ushioda, Makoto; Inoue, Hiromichi; and Yoshida, Naoyuki, 4,882,084, Cl. 252-299.660.
Mizrahi, Joseph, to IMC Fertilizer, Inc. Recovery of hydrogen fluoride from an aqueous solution containing ammonium fluoride and hydrogen fluoride. 4,882,134, Cl. 423-356.000.
Mizushima, Yukio: *See—*
Hirai, Kentaro; and Mizushima, Yukio, 4,882,338, Cl. 514-307.000.
Mizutani, Hikaru; and Maehara, Yoshimi, to Hitachi Maxell, Ltd. Mechanism for preventing loosening of tape in a tape cartridge. 4,881,696, Cl. 242-199.000.
Mizutani, Yoshihiko: *See—*
Shibata, Kazuyoshi; and Mizutani, Yoshihiko, 4,882,033, Cl. 204-425.000.
Mizutani, Yoshihisa, to Kabushiki Kaisha Toshiba. Non-volatile semiconductor memory device with double gate structure. 4,882,707, Cl. 365-185.000.
Mobil Oil Corporation: *See—*
Chen, Nai Y.; and Degnan, Thomas F., 4,882,039, Cl. 208-120.000.
Dessau, Ralph M.; and Valyocsik, Ernest W., 4,882,040, Cl. 208-138.000.
Tsao, Ying-Yen P., 4,882,307, Cl. 502-66.000.
Mochizuki, Norihiro: *See—*
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Mochizuki, Takeshi; Arimoto, Akira; and Saito, Susumu, to Hitachi, Ltd.; and Hitachi Koki Co., Ltd. Optical scanning apparatus with optical correction for scan mirror surface tilt. 4,882,483, Cl. 250-236.000.
Mochizuki, Yoshinori: *See—*
Fujii, Hiroshi; Iio, Tsukasa; Genba, Yasusi; Moriwaki, Hideaki; and Mochizuki, Yoshinori, 4,882,556, Cl. 335-8.000.
Mock, Bruno A. Control manifold inserted in the flow route of a system for transferring pressure media in a gaseous and/or liquid gaseous state. 4,881,961, Cl. 62-292.000.
Moeller, Roy P.; and Schackelford, Carl L., to Rainin Instrument Co., Inc. Solvent mixing chamber for a liquid chromatography system. 4,882,062, Cl. 210-656.000.
Moeller, Werner; and Ulmann, Andreas, to Messerschmitt-Boelkow-Blohm GmbH. Method for encapsulating microelectronic semiconductor and thin film devices. 4,882,298, Cl. 437-212.000.
Mogro-Campero, Antonio; and Turner, Larry G., to General Electric Company. Evaporation of high Tc Y-Ba-Cu-O superconducting thin

film on Si and SiO_2 with a zirconia buffer layer. 4,882,312, Cl. 505-1.000.

Moist, Stanford C., Jr.: *See*—
Haddock, John T.; Miller, Charles A.; Moist, Stanford C., Jr.; Nauman, Warren D.; and Pala, Ronald S., 4,881,911, Cl. 439-484.000.

Moksnes Manufacturing Co., Inc.: *See*—
Tump, Ronald S., 4,882,784, Cl. 364-567.000.

Mollenauer, Linn F., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Optical communications system comprising raman amplification means. 4,881,790, Cl. 350-96.160.

Moloney, Maurice M.: *See*—
Hilliard, Jeffrey L.; and Moloney, Maurice M., 4,882,281, Cl. 435-287.000.

Moluf, Allan A.: *See*—
Faulkerson, James L.; Picard, Raymond L.; Menard, Edward J.; Bennett, Sanford M.; McCarthy, Timothy J.; Foden, Edwin S.; Gipe, Michael A.; Moluf, Allan A.; Jacobs, Michael W.; and Boatner Bruce E., 4,882,629, Cl. 358-464.000.

Monitech Corporation: *See*—
Monroe, Paul; and Kurth, James, 4,882,564, Cl. 340-449.000.

Monroe, Larry D.; and Wood, William P., to Minnesota Mining and Manufacturing Co. Abrasive grits formed of ceramic containing oxides of aluminum and rare earth metal, method of making and products made therewith. 4,881,951, Cl. 51-309.000.

Monroe, Paul; and Kurth, James, to Monitech Corporation. Remote temperature monitoring system. 4,882,564, Cl. 340-449.000.

Monsanto Company: *See*—
Monzyk, Bruce F.; and Henn, Arthur R., 4,882,132, Cl. 423-139.000.
Talley, Arthur, Jr.; and Wilkie, Arnold E., 4,882,222, Cl. 428-362.000.
Udipi, Kishore, 4,882,382, Cl. 525-66.000.

Montaje Y. Construcciones Del Hierro, S.A.: *See*—
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Montgomery, Robert L.: *See*—
Finn, Jerome W.; Montgomery, Robert L.; and Schuchard, Frank B., 4,881,322, Cl. 29-878.000.

Monzyk, Bruce F.; and Henn, Arthur R., to Monsanto Company. Solvent extraction of cobalt using hydroxamic acids. 4,882,132, Cl. 423-139.000.

Moon, Vernon G.: *See*—
Hukvari, Istvan S.; Albert, Henry J.; Moon, Vernon G.; and Steffenson, Michael R., 4,882,128, Cl. 422-119.000.

Moore, Brian J.: *See*—
Braendel, Gregory G.; Goodwin, David M.; and Moore, Brian J., 4,881,353, Cl. 52-239.000.

Moore Business Forms, Inc.: *See*—
McIntyre, Timothy J.; and Greig, Walter G., 4,882,211, Cl. 428-40.000.

Moore, Scott E., to Micron Technology Inc. Fluid level sensing method and apparatus. 4,881,487, Cl. 116-227.000.

Moran-Iturralde, Anthony M.: *See*—
Goh, David; Moran-Iturralde, Anthony M.; and Howells, Geoffrey, 4,881,918, Cl. 453-4.000.

Moran, Lyle E., to Exxon Research and Engineering Company. Asphaltic composition. 4,882,373, Cl. 524-68.000.

Morgan, Charles R.; Chen, Cheng-Chi; Blinka, Thomas A.; and Obligin, Alan S., to W. R. Grace & Co.-Conn. Composition and process for separating fluid mixtures. 4,882,057, Cl. 210-500.230.

Morgan Construction Company: *See*—
Wykes, Philip; and Pariseau, David L., 4,881,310, Cl. 29-122.000.

Morgan, John M.: *See*—
Olson, A. L.; Batcheller, Tom A.; Rindfleisch, J. A.; and Morgan, John M., 4,881,574, Cl. 137-624.130.

Morgan, Leon: *See*—
Hoffine, Harold C.; Forsythe, John; and Morgan, Leon, 4,881,849, Cl. 405-128.000.

Morgan, Robert E.: *See*—
Schwartz, Edward M.; Morgan, Robert E.; and Everman, Wilburn D., 4,881,471, Cl. 108-144.000.

Mori, Kazuo: *See*—
Yasuda, Tomio; Aoki, Kohji; and Mori, Kazuo, 4,881,456, Cl. 98-2.010.

Mori, Tetsuzo: *See*—
Uzawa, Shunichi; Mori, Tetsuzo; and Koumura, Noboru, 4,882,776, Cl. 455-617.000.

Moriarty, Ann M.: *See*—
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Morikawa, Atsushi: *See*—
Yonezawa, Yasuo; Matsushita, Masao; Oku, Kenzo; Nakano, Hiroki; Okumura, Shin-ichi; Yoshihara, Motoshi; Sakai, Akiyoshi; and Morikawa, Atsushi, 4,881,376, Cl. 62-106.000.

Moriki, Yasumitsu; and Numakura, Hirotomo, to Maruma Jyusharyo Kabushiki Kaisha. Assembly apparatus for truck links. 4,881,365, Cl. 59-7.000.

Morimoto, Chikao: *See*—
Schlossman, Stuart; Morimoto, Chikao; and Rudd, Christopher, 4,882,424, Cl. 530-387.000.

Morimoto, Katsushi: *See*—
Yamamoto, Susumu; Kakuta, Takuya; Sato, Toshiaki; Morimoto, Katsushi; Oya, Eiichi; Ikai, Takashi; and Nawamaki, Tsutomu, 4,881,965, Cl. 71-92.000.

Morinaga, Akio: *See*—
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Morita, Masato: *See*—
Shinsha, Takao; Morita, Masato; Sakataya, Yoshinori; Tsuchiya, Yoji; Hikosaka, Mitsuhiro; Koshishita, Junji; Akiyama, Keiho; and Kubo, Takashige, 4,882,690, Cl. 364-490.000.

Morita, Shigeki: *See*—
Okada, Osamu; Morita, Shigeki; Nakashita, Shigeto; Masai, Tadahisa; Tominaga, Shigeru; and Inada, Hiroshi, 4,881,474, Cl. 110-263.000.

Moriuchi, Noboru; Yamaguchi, Yoshiki; Tanaka, Toshihiko; Hasegawa, Norio; Kawamoto, Yoshifumi; Kimura, Shin-ichiro; Kaga, Toru; and Kure, Tokuo, to Hitachi, Ltd. Method of making a semiconductor memory device with recessed array region. 4,882,289, Cl. 437-52.000.

Moriwaki, Hideaki: *See*—
Fujii, Hiroshi; Iio, Tsukasa; Genba, Yasusi; Moriwaki, Hideaki; and Mochizuki, Yoshinori, 4,882,556, Cl. 335-8.000.

Moriya, Koichi: *See*—
Shiokawa, Kozo; Tsuboi, Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, 4,882,344, Cl. 514-342.000.

Moro, Hideharu; and Narumiya, Yoshikazu, to TDK Corporation. Magnetic particles, method for making and electromagnetic clutch using same. 4,882,224, Cl. 428-403.000.

Morohoshi, Hideo: *See*—
Fukui, Hiroshi; Namba, Ryujiro; Saito, Tsutomu; Ohtsu, Yutaka; Kimura, Asa; Nakano, Motokiyo; Nakata, Okitsugu; Tommita, Kenichi; Tokubo, Kazuo; Ohno, Kazuhisa; Yoneyama, Toshio; Ogawa, Takashi; Morohoshi, Hideo; Koyama, Junichi; Kanda, Taketoshi; Kawaguchi, Kunihiro; and Shimizu, Yuzo, 4,882,225, Cl. 428-405.000.

Moroz, Chaya. Monoclonal antibodies to placental isoferritin for use in detecting oncofetal ferritin associated with breast cancer and Hodgkins disease. 4,882,270, Cl. 435-7.000.

Morrison, Dwayne E.: *See*—
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Morton Thiokol, Inc.: *See*—
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Moskovskoe Vyschee tekhnicheskoe uchilische imeni N.E.Baumana: *See*—
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Motozato, Yoshiaki, to Kurita Water Industries, Ltd. Beads of cross-linked glucomannan and production thereof. 4,882,426, Cl. 536-114.000.

Mouri, Hiroshi: *See*—
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Mowatt, Larry J.: *See*—
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Mrugala, Ronald J.; Raymer, Doyle; Negandhi, Dipak J.; and Latzko, Robert L., to King-Seeley Thermos Co. Plumbing module for bottled water cooler. 4,881,380, Cl. 62-389.000.

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Murakami, Shu; Ikebe, Tsuguo; Hakamada, Ichiro; and Yaoka, Osamu, to Yoshitomi Pharmaceutical Industries, Ltd. Piperidine compounds and pharmaceutical uses thereof. 4,882,326, Cl. 514-211.000.
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Murata, Kazushige, to INAX Corporation. Method for obtaining draincast hollow articles. 4,882,111, Cl. 264-87.000.
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Nagano, Eiki; Hashimoto, Shunichi; Yoshida, Ryo; Matsumoto, Hiroshi; and Kamoshita, Katsuzo, to Sumitomo Chemical Company, Limited. Tetrahydropthalimide compounds, and their production and use as herbicides. 4,881,970, Cl. 71-96.000.
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Naka, Mitsumura: *See—*
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Nakahama, Tadamitsu, to Mazda Motor Corporation. Multilayer coated film structures. 4,882,228, Cl. 428-421.000.
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Nakajima, Yoshio; Kimura, Takao; and Nagaoka, Yoshinobu, to Mitsubishi Petrochemical Co., Ltd. Method for producing polypropylene foam. 4,882,108, Cl. 264-54.000.
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Nakane, Shinichi; Uno, Takashi; Horii, Hiroshi; Kato, Shinzo; Namba, Mitsuo; and Uematsu, Reppei, to Matsushita Electric Industrial Co., Ltd.; and High Pressure Gas Safety Institute of Japan, The. Gas shutoff apparatus. 4,881,948, Cl. 48-192.000.
Nakano, Hiroki: *See—*
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Nakatani, Yoshihiro; and Fukatsu, Tsutomu, to Canon Kabushiki Kaisha. Video signal reproducing apparatus with memory. 4,882,633, Cl. 358-339.000.
Nakayama, Tadayoshi: *See—*
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Nassar, Munir N.; Agharkar, Shreeram N.; and Bogardus, Joseph B. Stable injectable antiemetic compositions. 4,882,356, Cl. 514-619.000.
Nasu, Masahiro; and Abe, Kiyoto, to Alps Electric Co., Ltd. Changeover writing circuit for magnetic disk apparatus operable at plural densities. 4,882,639, Cl. 360-65.000.
National Research Development Corporation: *See—*
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Naumann, Jorg; Sharnagl, Thomas; and Stroth, Leo, to Texas Instruments Deutschland GmbH. Method of making an electrically programmable integrated circuit containing meltable contact bridges. 4,882,293, Cl. 437-52.000.
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Neas, Edwin D.; and Floyd, Terry S., to CEM Corporation. Digestion apparatus useful for a kjeldahl method. 4,882,286, Cl. 436-175.000.
Nebel, David J. Horseshoe assembly and method of using same. 4,881,600, Cl. 168-11.000.
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Nemirovsky, Robert, to Deutsch, Joseph; and Nemirovsky, Robert. Clamping mechanism. 4,881,727, Cl. 269-309.000.
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Neugebauer, Wolfgang; and Poll, Heinz-Guenter, to Huels Aktiengesellschaft. Molding compounds comprising a thermoplastically processible aromatic polyester imide. 4,882,410, Cl. 528-170.000.
Neuhaus, Alfred; Ganster, Otto; and Mengal, Manfred, to Bayer Aktiengesellschaft. Process for the production of polyurethane foam moldings. 4,882,363, Cl. 521-122.000.
Neuman, Marcel, to Biomass Development Europe SA. Compression head for machine for continuously densifying vegetable matter. 4,881,886, Cl. 425-208.000.
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Newhouse, Delbert W., to General Motors Corporation. Tandem vacuum booster and diaphragm for same. 4,881,452, Cl. 92-48.000.
Newhouse, Delvert W., to General Motors Corporation. Tandem vacuum booster and diaphram for same. 4,881,451, Cl. 92-48.000.
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Nichols, Carl S., to BF Goodrich Company, The. Compositions of water-dispersed carboxyl-containing liquid polymers. 4,882,081, Cl. 292-182.280.
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Nichtberger, Steven; McGlynn, Kevin; and Snook, Corey, to Steven Nichtberger. Paperless system for distributing, redeeming and clearing merchandise coupons. 4,882,675, Cl. 364-401.000.
Nicolai, Robert L. Procedure for fining all words contained within any given word including creation of a dictionary. 4,882,703, Cl. 364-900.000.
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Nienstedt, Heinz. Apparatus for dividing parallelipipedic blocks of deep frozen foodstuffs into smaller units. 4,881,377, Cl. 62-320.000.
Niewohner, Ulrich; Hoever, Franz-Peter; Lieb, Folker; Oediger, Hermann; Rosentreter, Ulrich; Boshagen, Horst; Perzborn, Elisabeth; Fiedler, Volker-Bernd; and Seuter, Friedel, to Bayer Aktiengesellschaft. Chroman derivatives for combating thrombosis and asthma. 4,882,353, Cl. 514-456.000.
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Nilssen, Ole K. MOSFET flyback converter. 4,882,663, Cl. 363-19.000.
Nimura, Mitsuhiro; and Yokoyama, Shoji, to Aisin Aw Co., Ltd.; and Kabushiki Kaisha Shinsangyokaihatsu. Navigation apparatus. 4,882,696, Cl. 364-449.000.
Ninio, Jacob; Baratz, Jacob; and Moshe, Haim, to State of Israel, Ministry of Defence, Israel Military Industries, The. Electric igniter assembly. 4,881,463, Cl. 102-202.200.
Nippon Aluminum Manufacturing Company, Ltd., The: *See—*
Manable, Koichi; Naka, Mitsumura; and Futamura. Mitsushi, 4,882,042, Cl. 209-138.000.
Nippon Chemical Industrial Co., Ltd.: *See—*
Sonobe, Kozo; Fukuzawa, Takashi; Takeuchi, Kohsuke; Tabata, Tatushi; Fukuoka, Hiroshi; Hisamatsu, Kunio; and Katamura, Makoto, 4,882,303, Cl. 501-28.000.
Nippon Co., Ltd.: *See—*
Yoshioka, Shigehiko; Yamada, Hideto; Sato, Hisatake; and Kamei, Motokazu, 4,882,087, Cl. 252-312.000.
Nippon Conlux Co., Ltd.: *See—*
Kobayashi, Osamu; Sugimoto, Osamu; Furuya, Yonezou; Ishida, Takeshi; Tanaka, Masanori; and Ishii, Jun, 4,881,630, Cl. 194-203.000.
Nippon Electric Co., Ltd.: *See—*
Manabe, Daisuke, 4,882,616, Cl. 358-44.000.

Nippon Paint Co., Ltd.: *See*—
Ushio, Akira; and Sobata, Tomotsu, 4,882,215, Cl. 428-143.000.
Nippon Roki Co., Ltd.: *See*—
Itoh, Mikio, 4,882,051, Cl. 210-248.000.
Nippon Seimitsu Kogyo Kabushiki Kaisha: *See*—
Iijima, Tamotsu, 4,882,500, Cl. 310-323.000.
Nippon Sheet Glass Co., Ltd.: *See*—
Ino, Juichi; Hishinuma, Akihiro; Nagayama, Hirotsugu; and Kawahara, Hideo, 4,882,183, Cl. 427-126.600.
Seki, Shingo, 4,882,006, Cl. 156-504.000.
Nippon Shinyaku Co. Ltd.: *See*—
Kise, Masahiro; Ozaki, Masakuni; Kazuno, Kenji; Tomii, Yoshifumi; Segawa, Jun; and Yasufuki, Shoji, 4,882,328, Cl. 514-236.200.
Nippon Soda Co., Ltd.: *See*—
Ishimitsu, Keiichi; Imagawa, Hiroyuki; Yamada, Tomio; Matsuda, Michihiko; and Kitagawa, Yukio, 4,882,431, Cl. 540-603.000.
Nippon Soken, Inc.: *See*—
Tomita, Masahiro; and Yasuda, Eturo, 4,882,079, Cl. 252-62.900.
Nippon Television Network Corporation: *See*—
Sugimori, Yoshio; Araki, Yousai; Kurosaki, Tadao; and Urano, Joji, 4,882,628, Cl. 358-167.000.
Nippondenso Co., Ltd.: *See*—
Kabune, Hideki; Kamiya, Kohji; Miyake, Kiyoshi; Saito, Shigeru; Yamada, Shinichi; and Asami, Ken, 4,882,530, Cl. 318-696.000.
Setaka, Yousuke; Yanase, Sumio; Takeuchi, Kanji; and Miyahara, Masahiko, 4,881,414, Cl. 73-862.330.
Nishikawa, Hirotsugu: *See*—
Kato, Yoshiaki; Tanaka, Masashi; Tsujita, Mitsuji; Kimoto, Keizo; Nishikawa, Hirotsugu; and Kawaguchi, Mika, 4,882,253, Cl. 430-59.000.
Nishimura, Tetsuhiko; Basu, Swapan K.; Chida, Yukio; Oguri, Yasuo; and Inoue, Shoko, to Mitsubishi Kasei Corporation. Piezoelectric ceramic composition for actuators. 4,882,078, Cl. 252-629.000.
Nishimura, Yosaku, to Vital Kogyo Kabushiki Kaisha; and Ingersoll-Rand Company. Hand operated chain block. 4,881,720, Cl. 254-358.000.
Nishimura, Yukuo: *See*—
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Nishioka, Kimihiko: *See*—
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Nishiyodo Air Conditioner Co., Ltd.: *See*—
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Nissan Chemical Industries, Ltd.: *See*—
Yamamoto, Susumu; Kakuta, Takuya; Sato, Toshiaki; Morimoto, Katsushi; Oya, Eiichi; Ikai, Takashi; and Nawamaki, Tsutomu, 4,881,965, Cl. 71-92.000.
Nissan Motor Co., Ltd.: *See*—
Ichinose, Hisao, 4,881,773, Cl. 296-216.000.
Ishigami, Kazuhiro, 4,881,494, Cl. 123-41.120.
Ishii, Shigeru, 4,881,627, Cl. 192-0.076.
Kanesaki, Nobukazu, 4,881,369, Cl. 60-285.000.
Kobayashi, Masayuki; and Takiguchi, Masahiro, 4,881,429, Cl. 74-867.000.
Kondo, Nobuaki, 4,881,767, Cl. 292-224.000.
Kumasaka, Hideyuki; Takao, Kouji; and Kuriyama, Hiroshi, 4,881,756, Cl. 280-785.000.
Matayoshi, Yutaka; and Kamegaya, Shigeru, 4,881,497, Cl. 123-90.340.
Shinzawa, Motohiro; and Sekiya, Yoshiki, 4,881,501, Cl. 123-279.000.
Uchiyama, Hirao; and Taguchi, Hiromi, 4,881,659, Cl. 220-319.000.
Yakuyama, Takashi; and Ueda, Toshiaki, 4,882,527, Cl. 318-568.130.
Yamaguchi, Toshio, 4,881,628, Cl. 192-85.0AA.
Nisshin-DCA Foods, Inc.: *See*—
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Nissin Gourmet Beef Co., Ltd.: *See*—
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Nissin Kogyo Kabushiki Kaisha: *See*—
Horiuchi, Makota; Shimizu, Atsushi; Miyakawa, Yoshitaka; and Sakurai, Kazuya, 4,881,449, Cl. 91-372.000.
Nitto Kohki Co., Ltd.: *See*—
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Ohkita, Katsuhiko; Ogata, Kazuhiro; and Niwa, Ken, 4,882,101, Cl. 264-26.000.
Noami, Tsuneo: *See*—
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Nobile, John R., to Pitney Bowes Inc. Mailing machine including improved driving means circuit. 4,881,461, Cl. 101-235.000.
Noble, Phillip C.; and Tullos, Hugh S. Method and apparatus for prosthesis placement. 4,881,536, Cl. 606-94.000.
Nobumasa, Furuya: *See*—
Marugama, Kazuo; Horie, Kiyoshi; Noami, Tsuneo; Yamamoto, Toshiro; Adachi, Koji; Okamoto, Toru; Sumikawa, Takeshi; and Nobumasa, Furuya, 4,882,247, Cl. 430-45.000.
Noda, Tsutomu; Shirosugi, Takatoshi; Hotta, Nobutaka; and Okuda, Akihide, to Hitachi, Ltd.; and Hitachi Video Engineering, Incorporated. Multiplex transmission method and apparatus. 4,882,725, Cl. 370-11.000.
Noiret, Jacques: *See*—
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Noji, Minoru: *See*—
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Norand Corporation: *See*—
White, Jonathan R., 4,882,476, Cl. 235-462.000.
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Durant, Douglas M.; Kugler, Uwe H.; Vaughn, Bennie J.; Nordquist, Douglas W.; and Delfs, Larry M., 4,881,573, Cl. 137-614.040.
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Norling, Brian L.: *See*—
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Norman, Robert I.: *See*—
Staples, Linton D.; Norman, Robert I.; Davey, Robert B.; Hastings, Catherine; Kidd, Jennifer; and Rachmat, Jatni, 4,882,137, Cl. 424-423.000.
Norquest, Robert C.; and Coverdale, Kevin M., to Playtex Family Products Corporation. Tampon applicator wrap. 4,881,644, Cl. 206-363.000.
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Bruning, Gert W.; and Stupp, Edward H., 4,882,666, Cl. 363-97.000.
North, John R.; Petty-Saphon, Satham; and Sawyers, Craig G. Assay technique and equipment. 4,882,288, Cl. 436-525.000.
Northedge, Ronald. Flow meters. 4,881,412, Cl. 73-861.040.
Norton, Allen R., to American Locker Group Incorporated. Compressor. 4,881,653, Cl. 220-22.300.
Norwich Eaton Pharmaceuticals, Inc.: *See*—
Huang, Chau-Ting; Pelosi, Stanford S., Jr.; and Bayless, Allan V., 4,882,354, Cl. 514-461.000.
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Bocharov, Jury A.; Safonov, Anatoly V.; Nosov, Anatoly P.; Tamaris, Jury I.; Lunkov, Evgeny S.; Myakinenkov, Vladimir I.; Perepechin, Igor Y.; Rudman, Leonid L.; Salov, Viktor P.; Bovykin, Igor V.; and Zaidlin, Mark M., 4,881,399, Cl. 72-454.000.
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Novich, Bruce E., to Ceramics Process Systems Corp. Slurry for centrifugal classification of colloidal particles. 4,882,088, Cl. 252-313.100.
Novich, Bruce E.; and Halloran, John W., to Ceramics Process Systems Corp. Liquification of highly loaded composite systems. 4,882,304, Cl. 501-32.000.
Nowicki, Bogdan: *See*—
Hull, Richard A.; Hull, Sheila I.; and Nowicki, Bogdan, 4,882,425, Cl. 530-396.000.
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Nurse, Trevor W., to Humphreys & Glasgow Ltd. Clean electric power generation process. 4,881,366, Cl. 60-39.070.
Nussbaum, Stephanie; and Streets, Roger L., to Ashland Oil, Inc. Splice adhesive for EDPM roofing and splicing method employing same. 4,881,996, Cl. 156-157.000.
Nye, Stephen F., to Lifetime Products, Inc. Method and apparatus for adjusting a basketball goal. 4,881,734, Cl. 273-1.50R.
Nyffeler, Andreas; and Hubele, Adolf, to Ciba-Geigy Corporation. Use of quinoline derivatives for the protection of cultivated plants. 4,881,966, Cl. 71-94.000.
O/A Technologies, Inc.: *See*—
Kaneko, Tamaki, 4,881,730, Cl. 271-296.000.

O. Key Printed Wiring Co., Ltc.: *See*—
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Reunamaki, Pauli T.; and Jarvinen, 4,881,962, Cl. 65-104.000.
Oba, Koichiro; Schoeps, Wilfried; and Taqqu, David, to Hamamatsu Photonics Kabushiki Kaisha. Apparatus for detecting the position of incidence of particle beams including a microchannel plate having a strip conductor with combed teeth. 4,882,480, Cl. 250-213.0VT.
Obana, Bunichi; and Kanazawa, Kenichi, to Sony Corporation. FM communication device with avoidance of interference by substantially same channel FM signal. 4,882,768, Cl. 455-207.000.
Obara, Haruki, to Fanuc Ltd. Electrical discharge machining equipment. 4,882,464, Cl. 219-69.130.
Obase, Hiroyuki: *See*—
Oshima, Etsuo; Obase, Hiroyuki; Karasawa, Akira; Kubo, Kazuhiro; Miki, Ichiro; and Ishii, Akio, 4,882,351, Cl. 514-431.000.
Obasogie, Jackson. Smoking habit breaker. 4,881,554, Cl. 137-270.000.
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O'Brien, John K., to Colorgen, Inc. Remote color measurement device. 4,881,811, Cl. 356-323.000.
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Giroux, Pierre; Ochem, Dominique; and Durand, Jean-Claude, 4,882,093, Cl. 252-632.000.
O'Connor, Joseph G.; and Adair, Paul C., to Mead Corporation, The. Photosensitive imaging material employing photosensitive microcapsules containing a solid diluent. 4,882,259, Cl. 430-138.000.
Odemer, Walter, to Walter Odemer Co., Inc. Handle assembly for removable auto electronic equipment. 4,881,295, Cl. 16-114.00R.
Odemer, Walter, to Walter Odemer Co., Inc. Quick release minimum profile shuttle for vehicle radios and tape players. 4,881,910, Cl. 439-476.000.
Odhner, Hugo V. Board game method of play. 4,881,740, Cl. 273-248.000.
Oediger, Hermann: *See*—
Niewohner, Ulrich; Hoever, Franz-Peter; Lieb, Folker; Oediger, Hermann; Rosentreter, Ulrich; Boshagen, Horst; Perzborn, Elisabeth; Fiedler, Volker-Bernd; and Seuter, Friedel, 4,882,353, Cl. 514-456.000.
Oeggerli, Werner, to Rieter Machine Works Ltd. Method for manufacturing a perforated body, friction spinning means using the perforated body and a friction spinning device using the friction spinning means. 4,882,015, Cl. 204-11.000.
Oertley, Thomas E., to Caterpillar Inc. Sprocket assembly. 4,881,930, Cl. 474-162.000.
Ogata, Kazuhiro: *See*—
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Ogleby, John W.; and Charkley, Neville J., to Laporte Industries Limited. Process for monitoring the quantity of dimethyl hydantoin. 4,882,285, Cl. 436-98.000.
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Ohashi, Michihiro; and Nakamura, Norio, to Toyota Jidosha Kabushiki Kaisha. Electronic control device for internal combustion engine with EGR control apparatus. 4,881,509, Cl. 123-571.000.
Ohba, Hisao; Takekoshi, Tomoaki; and Kunichika, Kenji, to Fuji Photo Film Co., Ltd. Method for supplementing replenisher for developer in automatic developing machine for presensitized plate. 4,882,246, Cl. 430-30.000.
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Ohkita, Katsuhiko; Ogata, Kazuhiro; and Niwa, Ken, to Tokai Rubber Industries, Ltd. Method of producing a reinforced rubber hose by using a plastic mandrel. 4,882,101, Cl. 264-26.000.
Ohkubo, Kunihiko; and Fujii, Hidehiko, to Shimadzu Corporation. Apparatus for determining base sequence. 4,881,812, Cl. 356-344.000.
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Ohno, Chikai; and Hirata, Michiyuki, to Fujitsu Limited; and Fujitsu VLSI Limited. Synchronous semiconductor memory device. 4,882,712, Cl. 365-206.000.
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Ohno, Kouji; Saito, Shinichi; Miyazawa, Kazutoshi; Ushioda, Makoto; Inoue, Hiromichi; and Yoshida, Naoyuki, to Chisso Corporation. Optically active substituted biphenyl compounds. 4,882,084, Cl. 252-299.660.
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Okada, Osamu; Morita, Shigeki; Nakashita, Shigeto; Masai, Tadahisa; Tominaga, Shigeru; and Inada, Hiroshi, to Babcock-Hitachi Kabushiki Kaisha. Pulverized coal combustion apparatus. 4,881,474, Cl. 110-263.000.
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Okayasu, Kenji. Heat conducting device. 4,881,593, Cl. 165-104.290.
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Oldengott, Michael; Schade, Jorg; and Stephan, Peter, to Klockner-Becorit GmbH. Transfer station with lifting devices. 4,881,691, Cl. 241-101.500.
Olesen, Ejvid H. B., to Unibag A/S. Container and a method as well as an assembly for its manufacture. 4,881,825, Cl. 383-906.000.
Oletzke, G. James. Floating separable key case. 4,881,636, Cl. 206-37.100.
Olich, Eugene E.: *See*—
Brynsvold, Glen V.; Lopez, John T.; Olich, Eugene E.; and West, Calvin W., 4,882,514, Cl. 310-208.000.
Olin Corporation: *See*—
Pennington, B. Timothy, 4,882,443, Cl. 549-532.000.
SinghDeo, Narendra N.; Mahulikar, Deepak; and Butt, Sheldon H., 4,882,212, Cl. 428-76.000.
Smith, Charles W.; Butt, Sheldon H.; and Shapiro, Eugene, 4,882,236, Cl. 428-652.000.
Smith, William W.; and Knowles, Steven C., 4,882,465, Cl. 219-121.480.
Olin Hunt Specialty Products Inc.: *See*—
Kim, Hongzoon; Saunders, Edward C.; and Miller, Harris, 4,882,264, Cl. 430-467.000.
Ollivier, Roland: *See*—
Buzas, Andre ; and Ollivier, Roland, 4,882,331, Cl. 514-255.000.
Olorenshaw, George M.; and Macedo, Al. Lid removing tool. 4,881,432, Cl. 81-3.360.
Olson, A. L.; Batcheller, Tom A.; Rindfleisch, J. A.; and Morgan, John M., to United States of America, Energy. Enclosed rotary disc air pulser. 4,881,574, Cl. 137-624.130.
Olson, Raymond N.: *See*—
Flygare, Wayne A.; Olson, Raymond N.; Reynolds, Richard W.; and Aleem, Mohd A., 4,882,513, Cl. 310-114.000.
Olson, Roland F.; and Fergle, Richard R., to American Crystal Sugar Company. Method of producing sulfite-free sugarbeet pulp. 4,882,190, Cl. 426-541.000.
Olsson, Erik: *See*—
Medin, Gunnar; Olsson, Erik; Sjoo , Lennart; and Lundgren, Roger, 4,881,448, Cl. 89-36.020.
Olympus Optical Co., Ltd.: *See*—
Hasegawa, Akira; Takahashi, Susumu; Tsuji, Kiyoshi; Nishioka, Kimihiko; and Matsui, Hiroshi, 4,882,619, Cl. 358-55.000.
Hasegawa, Hiroshi, 4,881,810, Cl. 356-241.000.
Tateoka, Hitoshi; and Uchino, Fumio, 4,881,618, Cl. 181-176.000.
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Omron Tateisi Electronics Co.: *See*—
Nakamura, Hideaki; Shimamori, Tamotsu; and Murashige, Shinichi, 4,882,584, Cl. 341-139.000.
Onga, Takeo: *See*—
Uzuda, Tetsuji; Kuramoto, Takashi; Onga, Takeo; Suzuki, Teruo; Koizumi, Masaru; and Kondo, Takeo, 4,882,622, Cl. 358-80.000.
Onishi, Ken; and Sugiyama, Kazuhiro, to Mitsubishi Denki Kabushiki Kaisha. PCM recording and reproducing apparatus having common data frame construction for signal sources of varying quantization bit number. 4,882,638, Cl. 360-32.000.
Ono, Akira; Fuse, Toshikazu; Miyamoto, Osamu; Makino, Shoso; Yamato, Yoshihisa; Kametani, Hiroshi; Tokura, Susumu; Tanaka, Hiromi; Ito, Toru; Nakao, Hitomi; Tokuoka, Shuji; and Takeda, Toshihide, to Kanebo, Ltd. Fibrous structures having a durable fragrance. 4,882,220, Cl. 428-240.000.
Onoue, Takeshi: *See*—
Yato, Tadao; Onoue, Takeshi; and Tanaka, Hiroshi, 4,882,100, Cl. 264-0.500.
Oogita, Yoshinori; and Shino, Katsuhide, to Sharp Kabushiki Kaisha. Card-shaped electronic apparatus with embossed surface and method of producing same. 4,882,477, Cl. 235-488.000.
Ootsuka, Hiroshi: *See*—
Tanaka, Yoshihiro; Tsuji, Sadafusa; Hata, Yoshiaki; Inoue, Manabu; Ootsuka, Hiroshi; Iwata, Michihiro; Ishito, Fumiaki; and Hayama, Koh, 4,882,602, Cl. 354-457.000.
Opti-Patents-, Forschungs-und Fabrikations-AG: *See*—
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Optical Coating Laboratory, Inc.: *See*—
Temple, Michael D.; Seddon, Richard I.; and Johnson, Kim L., 4,882,198, Cl. 427-38.000.
Orain, Michel, to Glaenzer Spicer. Telescopic transmission joint, in particular for a vehicle. 4,881,923, Cl. 464-111.000.
Orlowsky, Michael G.: *See*—
Borlinghaus, Hans J.; and Orlowsky, Michael G., 4,881,781, Cl. 297-473.000.
Borlinghaus, Hans J.; Orlowsky, Michael G.; Goodbred, Neil G.; Humer, Mladen; and Cooper, Steven J., 4,881,827, Cl. 384-47.000.
Orsatti, Louis A., to Adams, U.S.A., Inc. Saftey base. 4,881,735, Cl. 273-25.000.
Ortho Pharmaceutical Corporation: *See*—
Kirchanski, Stefan J.; and Wardwell, Kathleen, 4,882,284, Cl. 436-63.000.
Orthwein, William C. Computer aided anti-buckling device for mine roof bolting machines. 4,881,604, Cl. 173-11.000.
Ortiz, Arturo L., to Tecumseh Products Company. Rotary compressor gas routing for muffler system. 4,881,879, Cl. 417-312.000.
OSA AB: *See*—
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Osawa, Izumi; Iino, Syuji; Hotomi, Hideo; Masaki, Kenji; and Doi, Isao, to Minolta Camera Kabushiki Kaisha. Photosensitive member having an overcoat layer comprising amorphous carbon. 4,882,256, Cl. 430-66.000.
Osawa, Nebuhiko: *See*—
Takamura, Yoshinobu; Katsumura, Norimichi; Osawa, Nebuhiko; and Watanabe, Kazuo, 4,882,546, Cl. 329-310.000.
Oshima, Etsuo; Obase, Hiroyuki; Karasawa, Akira; Kubo, Kazuhiro; Miki, Ichiro; and Ishii, Akio, to Roussel Uclaf. Tricyclic compounds. 4,882,351, Cl. 514-431.000.
Osuga, Minoru: *See*—
Suzuki, Seikoo; Miki, Masayuki; Sasayama, Takao; Osuga, Minoru; and Oyama, Yoshishige, 4,882,030, Cl. 204-406.000.
Otari Electric Company, Ltd.: *See*—
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Otsuga, Hisao: *See*—
Zenbayashi, Katsuaki; Otsuga, Hisao; Morinaga, Akio; Toyoshima, Osamu; and Shimokawa, Shinji, 4,882,470, Cl. 219-523.000.
Otsuki, Shinnichirou, to Canon Kabushiki Kaisha. Coordinates input system to data transmitter. 4,881,608, Cl. 178-18.000.
Outboard Marine Corporation: *See*—
Hansen, Loren F.; and Cozine, Mark L., 4,881,602, Cl. 172-22.000.
Owades, Joseph L. Process for producing a malt beverage having improved foaming properties and product produced therefrom. 4,882,186, Cl. 426-329.000.
Owens-Illinois Plastic Products Inc.: *See*—
Ajmera, Prakash R., 4,882,119, Cl. 264-526.000.
Ownby, Clifford H.; and Lesher, Larry E. Hanger bracket. 4,881,710, Cl. 248-311.200.
Oya, Eiichi: *See*—
Yamamoto, Susumu; Kakuta, Takuya; Sato, Toshiaki; Morimoto, Katsushi; Oya, Eiichi; Ikai, Takashi; and Nawamaki, Tsutomu, 4,881,965, Cl. 71-92.000.
Oyama, Yasuharu: *See*—
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Suzuki, Seikoo; Miki, Masayuki; Sasayama, Takao; Osuga, Minoru; and Oyama, Yoshishige, 4,882,030, Cl. 204-406.000.
Ozaki, Masakuni: *See*—
Kise, Masahiro; Ozaki, Masakuni; Kazuno, Kenji; Tomii, Yoshifumi; Segawa, Jun; and Yasufuki, Shoji, 4,882,328, Cl. 514-236.200.
Ozaki, Risuke, to O. Key Printed Wiring Co., Ltc. Method of manufacturing printed circuit boards. 4,882,000, Cl. 156-239.000.
Ozeki, Masakatsu: *See*—
Iijima, Ikuo; Ozeki, Masakatsu; Saiga, Yutaka; Ishizuka, Tohru; and Nosaka, Kunio, 4,882,340, Cl. 514-320.000.
Oziro, Takeshi: *See*—
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Pai, Li-Wen: *See*—
Liu, Jonq-Min; Chen, Tai-Jun; Tsai, Lii-Chyuan; and Pai, Li-Wen, 4,882,250, Cl. 430-58.000.
Paizes, George, to Gamma Lock (Proprietary) Limited. Teeth for use with earth moving equipment. 4,881,331, Cl. 37-142.00A.
Pala, Ronald S.: *See*—
Haddock, John T.; Miller, Charles A.; Moist, Stanford C., Jr.; Nauman, Warren D.; and Pala, Ronald S., 4,881,911, Cl. 439-484.000.
Pall Corporation: *See*—
Degen, Peter J.; and Harwood, Colin F., 4,882,056, Cl. 210-490.000.
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Paloma Kogyo Kabushiki Kaisha: *See*—
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Pankratz, Richard P., to E.I. Du Pont De Nemours and Company. Adherable polyester film. 4,882,379, Cl. 524-590.000.
Papa, Ralph A.; and Koser, James R., to Du Pont de Nemours, E. I., and Company. Electrical terminator device. 4,881,902, Cl. 439-76.000.
Papst-Motoren GmbH & Co. KG: *See*—
von der Heide, Johann, 4,882,511, Cl. 310-67.00R.

Paquet, Jean, to Centre Experimental De Recherche et D'Etudes Du Batiment. Method and device for mechanical testing of civil engineering structure surfacings. 4,881,405, Cl. 73-146.000.
PAR Microsystems, Inc.: *See*—
Miller, Phillip; Shindley, Richard P.; Feltz, Kristi T.; Hanson, George E.; and White, Jonathan R., 4,882,475, Cl. 235-383.000.
Paradies, Heinrich H., to Medice Chem.-Pharm. Fabrik. Pharmaceutical preparations. 4,882,435, Cl. 548-127.000.
ParaMagnetic Logging, Inc.: *See*—
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Parc, Guy: *See*—
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Dlugokecki, Andrew N., 4,881,880, Cl. 418-61.300.
Parker, Richard W.; Beery, James P.; Boblitt, Donald L.; and Starr, Robert L., to Parker Sweeper Company. Mobile vacuum system for use with a riding tractor mower. 4,881,362, Cl. 56-202.000.
Parker Sweeper Company: *See*—
Parker, Richard W.; Beery, James P.; Boblitt, Donald L.; and Starr, Robert L., 4,881,362, Cl. 56-202.000.
Parker, Thomas H.; and Flanigan, Virgil J. High efficiency gasifier with recycle system. 4,881,947, Cl. 48-89.000.
Parkson Corporation: *See*—
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Pasternack, Adalbert, to Dragerwerk Aktiengesellschaft. Protective suit having a supply of breathing air. 4,881,539, Cl. 128-201.270.
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Saupe, Thomas; Klebe, Gerhard; Schirmer, Ulrich; Paul, Gerhard; Kober, Reiner; Wuerzer, Bruno; Berghaus, Rainer; Meyer, Norbert; and Westphalen, Karl-Otto, 4,881,969, Cl. 71-94.000.
Paul, Herman L., Jr. Power actuator with lost motion arrester. 4,881,420, Cl. 74-109.000.
Pauling, Horst: *See*—
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Paulman, Roger; and Wohrstein, Franz X., to Peerless of America Incorporated. Heat exchanger assembly with integral fin unit. 4,881,311, Cl. 29-157.30A.
Pavie, Denis, to Societe Anonyme dite: VIBRACHOC. Device for locking an electronic equipment housing on a tray. 4,882,655, Cl. 361-391.000.
Peck, Paul L., to Archery Designs, Inc. Adjustable grip and trigger bow string release. 4,881,516, Cl. 124-35.00A.
Peerless of America Incorporated: *See*—
Paulman, Roger; and Wohrstein, Franz X., 4,881,311, Cl. 29-157.30A.
Peirish, Alfred J.: *See*—
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Pelosi, Stanford S., Jr.: *See*—
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Pengeinstitutternes Kobe - og Kreditkortaktieselskab: *See*—
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Penman, Sheldon; and Fey, Edward G., to Massachusetts Institute of Technology. Method for determining tissue of origin and degree of malignancy of tumor cells. 4,882,268, Cl. 435-5.000.
Pennington, B. Timothy, to Olin Corporation. Alkylene oxides production from C7 to C22 olefins using molten nitrate salt catalyst. 4,882,443, Cl. 549-532.000.
Pennington, Terris L., to Rane Corporation. Synchronous modulation circuit. 4,882,664, Cl. 363-41.000.
Pennwalt Corporation: *See*—
Bartoszek, Edward J., 4,881,794, Cl. 350-96.230.
Perakis, Mike. Siphon dispenser. 4,881,667, Cl. 222-437.000.
Peranio, Anthony, to Purewater Sciences International, Inc. Filter structure for liquid purification and incorporating detent arrangement. 4,882,052, Cl. 210-282.000.
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Perkin-Elmer Corporation, The: *See*—
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Vollaro, Joseph F., 4,881,711, Cl. 248-362.000.
Perlman, Marvin K.; and Perlman, Richard S. Hood ornament theft alarm. 4,882,563, Cl. 340-426.000.
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Perlman, Marvin K.; and Perlman, Richard S., 4,882,563, Cl. 340-426.000.
Permelec Electrode Ltd.: *See*—
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Peroxid-Chemie GmbH: *See*—
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Perry, Michael; and Yasumura, Gary, to Beta Phase, Inc. High density and high signal integrity connector. 4,881,908, Cl. 439-161.000.
Perzborn, Elisabeth: *See*—
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Peter, Siegfried: *See*—
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Peters, Dieter, to Hoechst Aktiengesellschaft. Process for the production of transparent aluminum nitride coatings from ammine salts of aluminum iodides. 4,882,135, Cl. 423-412.000.
Peters, Dieter, to Hoechst Aktiengesellschaft. Process for the production of transparent aluminum nitride films. 4,882,136, Cl. 423-412.000.
Peters, Hartmut: *See*—
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Peters, Horst: *See*—
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Peters, Jack; and Melton, Jack T. Hat and boot case. 4,881,637, Cl. 206-278.000.
Peters, Rex B.: *See*—
Hulsing, Rand H., II; Peters, Rex B.; and Norling, Brian L., 4,881,408, Cl. 73-517.0AV.
Peters, Roger D. Mechanical plate clamp. 4,881,745, Cl. 279-4.000.
Peterson, Bruce R.: *See*—
Graham, Randolph H.; Peterson, Bruce R.; and Blackborow, Richard J., 4,882,671, Cl. 364-200.000.
Peterson, Robert K.; Mowatt, Larry J.; and Poteet, Aaron D., to Texas Instruments Incorporated. Thermal interface for a printed wiring board. 4,882,454, Cl. 174-68.500.
Petitjean, Gilbert; and Lebourg, Michel, to U.S. Philips Corporation. Interrupter arrangement for high-frequency signals. 4,882,504, Cl. 307-256.000.
Petroleo Brasileiro S.A. - Petrobras: *See*—
Franco, Zadson d. A.; and Barreto, Demostenis A. W., 4,881,599, Cl. 166-284.000.
Petrucci, Raymond M.; Giordano, Edward; Hafner, Bruce; and Taylor, Bruce G., to Cuno, Incorporated. Filter apparatus. 4,882,061, Cl. 210-652.000.
Pettibone, Donald W.: *See*—
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Senatore, Guy; Shang, Wei-Teh W.; and Goetz, Kenneth D., 4,882,416, Cl. 528-388.000.
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Picheny, Michael A.: *See*—
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Picker International, Inc.: *See*—
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Picker International, Ltd.: *See*—
Young, Ian R.; and Hall, Alasdair S., 4,882,560, Cl. 335-299.000.
Pickering, John J. Crankcase ventilator. 4,881,511, Cl. 123-572.000.
Pidgeon, Charles: *See*—
Hunt, Anthony C.; and Pidgeon, Charles, 4,882,165, Cl. 424-450.000.
Pielet, Howard M.; Frank, Larry A.; Edgar, William; and Alavanja, Milan, to Inland Steel Company. Steel product with globular manganese sulfide inclusions. 4,881,990, Cl. 148-320.000.
Pieper, Helmut, to Sorg GmbH & Co. KG. Method for efficiently using flue gas energy in a glass furnace. 4,882,736, Cl. 373-32.000.
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Pinchuk, Leonard, to Corvita Corporation. Crack prevention and improved thrombogenicity of implanted prostheses by sulfonation. 4,882,148, Cl. 424-423.000.
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Pine Instrument Company: *See*—
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Pinneo, John M., to Crystallume. Method for preparation of diamond ceramics. 4,882,138, Cl. 423-446.000.
Pinney, J. Dana. Brush cutter blade. 4,881,438, Cl. 83-840.000.
Pioneer Electronic Corporation: *See*—
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Kimura, Toshiyuki; Aoyagi, Yoshio; and Endo, Fumio, 4,882,719, Cl. 369-32.000.
Matsuura, Ryo; Isobe, Nobuyuki; and Kase, Masao, 4,882,722, Cl. 369-75.200.
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Pioneer Video Corporation: *See*—
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Pirelli General plc: *See*—
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Pitney Bowes Inc.: *See*—
Bannister, Ray L.; Close, Frederick C.; and Coeber, Peter J., 4,881,460, Cl. 101-91.000.
Nobile, John R., 4,881,461, Cl. 101-235.000.
Pitt, Alan D. Security grille and manufacturing method. 4,881,354, Cl. 52-665.000.
Plant, Anthony B., to Lucas Industries Public Limited Company. Circuit arrangement for detecting a critical frequency of input pulses. 4,882,545, Cl. 328-138.000.
Playtex Family Products Corporation: *See*—
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Plessey Electronic Systems Corp.: *See*—
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Plew, Theodore G.: *See*—
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Ploog, Klaus: *See*—
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Plummer, William T., to Polaroid Corporation. Method for making a smooth, uniform image of a laser diode array. 4,882,594, Cl. 346-108.000.
Plus Development Corporation: *See*—
Graham, Randolph H.; Peterson, Bruce R.; and Blackborow, Richard J., 4,882,671, Cl. 364-200.000.
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Eidenschink, Rudolf; Krause, Joachim; Hittich, Reinhard; Poetsch, Eike; Scheuble, Bernhard; Weber, Georg; and Pohl, Ludwig, 4,882,082, Cl. 252-299.610.
Pohoreski, Anton P., to Continental Manufacturing & Sales Inc. Method for the treatment of sewage and other impure water. 4,882,069, Cl. 210-713.000.
Pokrandt, Glenn C.; Busser, William F.; Timmermann, Donald N.; and Kuliga, Thomas N., to Falk Corporation, The. Flexible shaft coupling with coated grid. 4,881,921, Cl. 464-54.000.
Polaroid Corporation: *See*—
Plummer, William T., 4,882,594, Cl. 346-108.000.
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Polygram International Holding B.V.: *See*—
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Polytechnic University: *See*—
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POM Incorporated: *See*—
Ward, Seth, II, 4,881,631, Cl. 194-228.000.
Pond, Robert B., Sr. Process for modifying the surface of metal or metal alloy substrates and surface modified products produced thereby. 4,881,681, Cl. 228-198.000.
Porta Systems Corp.: *See*—
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Portelli, Gene B.: *See*—
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Portier, Ralph J., to Louisiana State University. Decontamination of contaminated streams. 4,882,066, Cl. 210-679.000.
Posner, Barry I.; and Fantus, I. George. Vanadium-peroxide compositions as insulin mimickers. 4,882,171, Cl. 424-616.000.
Potash, Richard J.; and Burns, Steven K., to Computer Sports Medicine, Inc. Method for adjusting clocks of multiple data processors to a common time base. 4,882,739, Cl. 375-109.000.
Poteet, Aaron D.: *See*—
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Powell, John M.; and Bruck, Louis D., to General Electric Company. Method of assembling an anti-sweat heater in a refrigerator cabinet. 4,881,315, Cl. 29-450.000.
Powers, John A.; Patton, James C.; and Christini, James N., to GTE Products Corporation. Process for recovering tungsten from organic solutions. 4,882,131, Cl. 423-54.000.
PPM, Inc.: *See*—
Shofner, Frederick M., 4,881,957, Cl. 55-97.000.
Prasad, Ravi; and Haas, Oscar W., to Union Carbide Corporation. Prevention of membrane degradation. 4,881,953, Cl. 55-16.000.
Preat, Jean-Luc: *See*—
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Pruett, Wayne P.: *See*—
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Pruim, Ronald. Lock for a brake valve. 4,881,388, Cl. 70-175.000.
Przbylinski, Phillip G.: *See*—
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Pyne, John, Jr.; Stewart, Dorothy L.; Fredrickson, James K.; and Cohen, Martin S., to Electric Power Research Institute, Inc. Method for solubilization of low-rank coal using a cell-free enzymatic system. 4,882,274, Cl. 435-68.000.
Quad/Tech, Inc.: *See—*
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Quint, Jeanne M.; and Tomaszewski, Isabel B., to Wang Laboratories, Inc. Apparatus and method for control of one computer system by another computer system. 4,882,674, Cl. 364-200.000.
Quittkat, Joerg; and Thiel, Gerhard, to Siemens Aktiengesellschaft. Monitoring system for electrodynamic wall-thickness and defect testing using a delay line. 4,882,539, Cl. 324-229.000.
R. J. Reynolds Tobacco Company: *See—*
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Radio Frequency Systems, Inc.: *See—*
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Rahtgen, Preben, to Pengeinstitutternes Kobe - og Kreditkortaktieselskab. Apparatus for communicating with data systems and a method of communicating with data systems. 4,882,779, Cl. 380-24.000.
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Rainin Instrument Co., Inc.: *See—*
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Ranke, Gerhard; and Diehl, Elmar, to Linde Aktiengesellschaft. Fractionation of a hydrocarbon mixture. 4,881,960, Cl. 62-20.000.
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Rempel, Frank; Zacharias, Clarence M.; and Maxwell, Linden G., to Rem Manufacturing Ltd. Vacuum particulate transfer apparatus. 4,881,855, Cl. 406-53.000.
Rendon, Mark A.; Treszoks, Erik A.; and Grimm, Thomas R., to Texas Instruments Incorporated. Printer having paper-out and column zero detection mechanism. 4,881,840, Cl. 400-705.100.
Renshaw, Kenneth H.; and Murphy, Timothy A., to Hughes Aircraft Company. Steerable beam antenna system using butler matrix. 4,882,588, Cl. 342-373.000.
Research Foundation of State University of New York, The: *See—*
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Waldhauer, Fred D., 4,882,762, Cl. 381-106.000.
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Rhyne, Theodore L., to Marquette Electronics. Apparatus and method for obtaining ultrasonic backcatter measurement from tissue. 4,881,549, Cl. 128-660.070.
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Riba, Gunther. Steam generator. 4,881,493, Cl. 122-13.00A.
Rich, Gregory E.; Giacomazzi, Roy A.; and Wilds, Jack C., to General Motors Corporation. Combination filler pipe and vapor control means. 4,881,578, Cl. 141-44.000.
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Richter, Johan C. F. C.; Ricter, Ole J.; and Jacobsen, Finn, to Kamyr AB. Effective diffuser/thickener screen backflushing. 4,881,286, Cl. 8-156.000.

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Rockarts, Rene L.; and Bartley, Donald R., to Uniroyal Goodrich Tire Company, The. Plug-resistant arch-vents for a tire mold. 4,881,881, Cl. 425-28.100.

Rockower, Gerald, to Brooklyn Union Gas. Liquid removal system. 4,881,567, Cl. 137-203.000.

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Rosenthal, Andre; Hunger, Hans-Dieter; Kagelmaker, Horst; and Gratschus, Monika, to Akademie Der Wissenschaften Der DDR. Device for solid phase sequencing of nucleic acid fragments. 4,882,127, Cl. 422-50.000.

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Rubenstein, Charles B.: *See*—
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Rubin, Leslie S.; and Hug, Hans A., to Foster-Miller, Inc. Separation system for dewatering radioactive waste materials. 4,882,094, Cl. 252-633.000.

Ruckes, Andreas; Grogler, Gerhard; and Kopp, Richard, to Bayer Aktiengesellschaft. Process for the production of polyurethane urea elastomers. 4,882,361, Cl. 521-51.000.

Ruckes, Andreas: *See*—
Grogler, Gerhard; Ruckes, Andreas; and Hess, Heinrich, 4,882,409, Cl. 528-64.000.
Grogler, Gerhard; Ruckes, Andreas; Hess, Heinrich; and Kopp, Richard, 4,882,411, Cl. 528-54.000.

Rudd, Christopher: *See*—
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Rudman, Leonid L.: *See*—
Bocharov, Jury A.; Safonov, Anatoly V.; Nosov, Anatoly P.; Tamaris, Jury I.; Lunkov, Evgeny S.; Myakinenkov, Vladimir I.; Perepechin, Igor Y.; Rudman, Leonid L.; Salov, Viktor P.; Bovykin, Igor V.; and Zaidlin, Mark M., 4,881,399, Cl. 72-454.000.

Rudy, Thomas P.; Goodson, Forrest R.; and Dudley, Mark E., to United Technologies Corporation. Iron oxide catalyst propellant, and method for making same. 4,881,994, Cl. 149-109.400.

Rueben, Ronnie. Compact hand-portable humidifier. 4,882,096, Cl. 261-30.000.

Ruggieri, Daniel: *See*—
Chiodini, Laura; Gobbini, Mauro; Mantegani, Sergio; Ruggieri, Daniel; Temperilli, Aldemio; Traquandi, Gabriella; and Ferrari, Patrizia, 4,882,315, Cl. 514-26.000.

Rump, Hanns: *See*—
Holter, Heinz; Igelbuscher, Heinrich; Gresch, Heinrich; Dewert, Heribert; and Rump, Hanns, 4,882,287, Cl. 436-149.000.

Rumpel, Harvey R.: *See*—
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Runkles, Richard R.; Dyer, John A.; and Beyer, Jack W., to Stanley Aviation Corporation. Conduit coupling device with redundancy features. 4,881,760, Cl. 285-93.000.

Rupp, Charle'3 R.; and Stronge, William R., to Fairchild Semiconductor Corporation. Cellular addressing permutation bit map raster graphics architecture. 4,882,683, Cl. 364-521.000.

Russ, Jurgen: *See*—
Schmidt, Christoph; Schon, Rudolf; and Russ, Jurgen, 4,881,542, Cl. 128-207.140.

Russell, Peter J.: *See*—
Kenyon, Ian R.; Russell, Peter J.; and Taylor, Thomas, 4,882,074, Cl. 252-8.800.

Russell, Samuel S.: *See*—
Holderfield, Daron C.; Martin, Bernard E.; and Russell, Samuel S., 4,881,411, Cl. 73-856.000.

Rutgerswerke AG: *See*—
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RWC, Inc.: *See*—
Cailey, Ronald J.; Nichols, John F.; and Heidtman, Herman F., 4,881,633, Cl. 198-345.000.

Ryckman, William D., Jr.: *See*—
Lyga, Thomas M.; and Ryckman, William D., Jr., 4,881,457, Cl. 99-323.500.

Ryobi Ltd.: *See*—
Emura, Masaharu, 4,881,699, Cl. 242-248.000.

Sadd, John S.: *See*—
Bolt, Anthony J. N.; and Sadd, John S., 4,881,555, Cl. 131-335.000.

Sadoway, Donald R.; and Singh, Rana P., to Massachusetts Institute of Technology. Method of forming a metal coating on a substrate. 4,882,199, Cl. 427-53.100.

Saegusa, Kunio, to Sumitomo Chemical Company, Limited. Method for producing a flaky material. 4,882,133, Cl. 423-335.000.

Saegusa, Kunio: *See*—
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Safonov, Anatoly V.: *See*—
Bocharov, Jury A.; Safonov, Anatoly V.; Nosov, Anatoly P.; Tamaris, Jury I.; Lunkov, Evgeny S.; Myakinenkov, Vladimir I.; Perepechin, Igor Y.; Rudman, Leonid L.; Salov, Viktor P.; Bovykin, Igor V.; and Zaidlin, Mark M., 4,881,399, Cl. 72-454.000.

Saiga, Yutaka: *See*—
Iijima, Ikuo; Ozeki, Masakatsu; Saiga, Yutaka; Ishizuka, Tohru; and Nosaka, Kunio, 4,882,340, Cl. 514-320.000.

Saiki, Yoshiaki: *See*—
Kagawa, Junichi; Saiki, Yoshiaki; and Amano, Kozo, 4,881,403, Cl. 73-115.000.

St. Peter, Larry. Thumbtack tool. 4,881,676, Cl. 227-63.000.

Saita, Tsuneo: *See*—
Takeuchi, Setsuo; Kochi, Mutsuyuki; Kawarada, Akira; Esumi, Shinichiro; Sasaki, Kaguya; Kawabata, Shozo; Saita, Tsuneo; Inoue, Yukio; Yamamoto, Makoto; and Sekine, Keiji, 4,882,314, Cl. 514-23.000.

Saito, Shigeru: *See*—
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Saito, Shinichi: *See*—
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Saito, Shinji: *See*—
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Saito, Susumu: *See*—
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Saito, Takashi: *See*—
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Saito, Takasui: *See*—
Hayashi, Shigeru; Saito, Takasui; Horiuchi, Shoji; and Takahashi, Tadashi, 4,882,478, Cl. 250-211.00R.

Saito, Toshisaida: *See*—
Shinjo, Katsumi, 4,881,395, Cl. 72-90.000.

Saito, Tsutomu: *See*—
Fukui, Hiroshi; Namba, Ryujiro; Saito, Tsutomu; Ohtsu, Yutaka; Kimura, Asa; Nakano, Motokiyo; Nakata, Okitsugu; Tommita, Kenichi; Tokubo, Kazuo; Ohno, Kazuhisa; Yoneyama, Toshio; Ogawa, Takashi; Morohoshi, Hideo; Koyama, Junichi; Kanda, Taketoshi; Kawaguchi, Kunihiro; and Shimizu, Yuzo, 4,882,225, Cl. 428-405.000.

Saitoh, Makoto: *See*—
Takao, Shoji; Nakashima, Hiroshi; Watanabe, Makoto; Saitoh, Makoto; Chiba, Kyoko; and Suzuki, Kazuo, 4,882,180, Cl. 426-46.000.

Sakai, Akiyoshi: *See*—
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Sakai, Michinori: *See*—
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Sakai, Tadaaki, to Nissin Gourmet Beef Co., Ltd. Continuous quick freezing apparatus for food. 4,881,379, Cl. 62-380.000.

Sakakibara, Naoji: *See*—
Nakashima, Hiroshi; Sakakibara, Naoji; and Fushimi, Takehiko, 4,881,611, Cl. 180-79.100.

Sakakibara, Teigo: *See*—
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Sakamoto, Keiji: *See*—
Sogabe, Masatoyo; Okuda, Kanemasa; Sakamoto, Keiji; and Matsubara, Shunsuke, 4,882,528, Cl. 318-600.000.

Sakamoto, Masashi, to Minolta Camera Kabushiki Kaisha. Electrophotographic copying machine. 4,882,605, Cl. 355-215.000.

Sakata, Toshio, to Minolta Camera Kabushiki Kaisha. Original document cover device. 4,882,603, Cl. 355-75.000.

Sakataya, Yoshinori: *See*—
Shinsha, Takao; Morita, Masato; Sakataya, Yoshinori; Tsuchiya, Yoji; Hikosaka, Mitsuhiro; Koshishita, Junji; Akiyama, Keiho; and Kubo, Takashige, 4,882,690, Cl. 364-490.000.

Sakikawa, Shigenori: *See*—
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Sakurai, Kazuya: *See*—
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Sakurai, Yoshihiro; Fukuda, Yoshihide; and Abe, Kouji, to Sanshin Kogyo Kabushiki Kaisha. Exhaust device for outboard motor. 4,881,370, Cl. 60-310.000.

Sakuramoto, Akihiko: *See*—
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Salmon, David A.: *See*—
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Salov, Viktor P.: *See*—
Bocharov, Jury A.; Safonov, Anatoly V.; Nosov, Anatoly P.; Tamaris, Jury I.; Lunkov, Evgeny S.; Myakinenkov, Vladimir I.; Perepechin, Igor Y.; Rudman, Leonid L.; Salov, Viktor P.; Bovykin, Igor V.; and Zaidlin, Mark M., 4,881,399, Cl. 72-454.000.

Salvati, Patricia: *See*—
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Samas, Mark V.: *See*—
Amos, Michael D.; Brosnan, Denis A.; Samas, Mark V.; Singer, Richard E.; Whetsel, James E.; and Kovarik, David P., 4,881,677, Cl. 228-33.000.

Sanai, Yukiharu, to Mitsubishi Denki Kabushiki Kaisha. Rotating drum device for a VCR in which the position of the magnetic head is controlled by a magnetic positioning device. 4,882,635, Cl. 360-10.200.

Sandels, Claes M. C. Artificial water lagoons. 4,881,847, Cl. 405-52.000.

Sandermann, Karl-Heinz: *See*—
Breitscheidel, Hans-Ulrich; Kautz, Rudolf; and Sandermann, Karl-Heinz, 4,882,208, Cl. 428-17.000.

Sandoz Ltd.: *See*—
Dixon, Michael W., 4,881,941, Cl. 8-482.000.

Sandusky Plastics, Inc.: *See*—
Chumley, Dexter W.; and Miller, Fredrick O., 4,881,656, Cl. 220-270.000.

Sandwith, Stanley R.; and Wittenberg, Daniel. Floating storage facility for fluid-like materials. 4,881,482, Cl. 114-256.000.

San Filipo, Frank J. Fuel supply mechanism for an internal combustion engine. 4,881,507, Cl. 123-523.000.

Sankyo Manufacturing Company, Ltd.: *See*—
Kato, Heizaburo, 4,881,828, Cl. 384-127.000.

Sannan, Takanori; Seki, Mitsutaka; Tsuchida, Shinya; and Horiguchi, Shojiro, to Dainichiseika Color & Chemicals Mfg. Co. Ltd. Seed colorant. 4,881,343, Cl. 47-57.600.

Sano, Masafumi: *See*—
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Sano, Shoichi; Furukawa, Yoshimi; Ogura, Masami; Abe, Masaru; and Oyama, Yasuharu, to Honda Giken Kogyo Kabushiki Kaisha. Steering system for front and rear wheels of automotive vehicle. 4,881,748, Cl. 280-91.000.

Sano, Yasuro, to Janome Sewing Machine. Device for attaching electronic circuit plate of computer-operated sewing machine. 4,881,478, Cl. 112-259.000.

Sanshin Kogyo Kabushiki Kaisha: *See*—
Sakurai, Yoshihiro; Fukuda, Yoshihide; and Abe, Kouji, 4,881,370, Cl. 60-310.000.

Sansone, Reno D., to Wadell Equipment Company, Inc. Flexible machining system. 4,881,309, Cl. 29-27.00A.

Santangelo, Joseph G.: *See*—
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Santel, Hans-Joachim: *See*—
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Santoleri, Joseph J.; and Ross, Richard D., to Four Nines, Inc. Apparatus for concentrating brine waters or dewatering brines generated in well drilling operation. 4,882,009, Cl. 159-4.200.

Santos, Richard. Neck support collar. 4,881,529, Cl. 128-75.000.

Sanyo Electric Co., Ltd.: *See*—
Masumoto, Takahiko, 4,882,613, Cl. 358-37.000.
Yamaguchi, Hideya; Hayasaki, Hiroyuki; Kawakami, Masamichi; Houjiyou, Yuji; Hobo, Yoshihiro; Arimatsu, Youichirou; Tsuji,

Yasunori; Hasegawa, Masaaki; and Katou, Seiji, 4,882,630, Cl. 358-451.000.

Saotome, Shigeru; and Ishida, Masamitsu, to Fuji Photo Film Co., Ltd. Radiation image recording and read-out apparatus. 4,882,489, Cl. 250-327.200.

Sappok, Manfred, to Siempelkamp Giesserei GmbH & Co. Method of making radiation shielding elements for use in nuclear technology. 4,882,092, Cl. 252-628.000.

Sapporo Breweries Limited: *See*—
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Sargent, Ronald J.: *See*—
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Sarh, Branko. Convertible fixed wing aircraft. 4,881,700, Cl. 244-2.000.

Sasajima, Kouji: *See*—
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Sasaki, Kaguya: *See*—
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Sasaki, Shoko: *See*—
Shiokawa, Kozo; Tsuboi, Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, 4,882,344, Cl. 514-342.000.

Sasaki, Toyonori: *See*—
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Sasayama, Takao: *See*—
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Sasser, Thurman: *See*—
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Sato, Chikara: *See*—
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Sato, Hirokazu: *See*—
Hirabayashi, Shigeto; and Sato, Hirokazu, 4,882,267, Cl. 430-546.000.

Sato, Hiromitsu; Kubota, Shinichi; Totsune, Atsushi; and Asakura, Masahiko, to Honda Giken Kogyo Kabushiki Kaisha. Device for detecting current flowing in an electric wire. 4,882,538, Cl. 324-127.000.

Sato, Hisatake: *See*—
Yoshioka, Shigehiko; Yamada, Hideto; Sato, Hisatake; and Kamei, Motokazu, 4,882,087, Cl. 252-312.000.

Sato, Junichi, to Canon Kabushiki Kaisha. Method for controlling mode of information signal reproducing apparatus. 4,882,641, Cl. 360-77.140.

Sato, Shoji: *See*—
Ando, Yoshio; Ishige, Yoshiki; Kinugasa, Toshiyuki; and Sato, Shoji, 4,882,002, Cl. 156-310.000.

Sato, Tadakuni; and Tachiya, Yuichi, to Tokin Corporation. Method for producing a rare earth metal-iron-boron anisotropic sintered magnet from rapidly-quenched rare earth metal-iron-boron alloy ribbon-like flakes. 4,881,986, Cl. 148-103.000.

Sato, Takumi: *See*—
Mitsuishi, Akio; Nakazawa, Yasuhiko; and Sato, Takumi, 4,881,832, Cl. 400-124.000.

Sato, Toshiaki: *See*—
Yamamoto, Susumu; Kakuta, Takuya; Sato, Toshiaki; Morimoto, Katsushi; Oya, Eiichi; Ikai, Takashi; and Nawamaki, Tsutomu, 4,881,965, Cl. 71-92.000.

Sato, Yasuyuki; Saito, Shinji; and Yamauchi, Hidetoshi, to Ibiden Co., Ltd. Electronic circuit substrates. 4,882,455, Cl. 174-68.500.

Sato, Yougi, to Brother Kogyo Kabushiki Kaisha. Printing apparatus capable of backlash regulation. 4,881,834, Cl. 400-279.000.

Satoh, Keiji; and Kozuki, Susumu, to Canon Kabushiki Kaisha. Apparatus for reproducing information signals by intermittently feeding tape-shaped record bearing medium. 4,882,634, Cl. 360-10.200.

Satoh, Noboru: *See*—
Itoh, Tetsuo; Satoh, Noboru; Takahashi, Kazuhiko; Suminoe, Taro; and Shimizu, Takao, 4,882,403, Cl. 526-245.000.

Satoh, Tsutomu: *See*—
Okada, Atsuyuki; Kubota, Kouhei; Satoh, Tsutomu; Gotoh, Hiroshi; and Oziro, Takeshi, 4,882,126, Cl. 420-516.000.

Satsumi, Shinroku: *See*—
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Saunders, Edward C.: *See*—
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Saupe, Thomas; Klebe, Gerhard; Schirmer, Ulrich; Paul, Gerhard; Kober, Reiner; Wuerzer, Bruno; Berghaus, Rainer; Meyer, Norbert; and Westphalen, Karl-Otto, to BASF Aktiengesellschaft. Sulfonamides. 4,881,969, Cl. 71-94.000.

Sawada, Hiroshi; and Merson, Richard L., to Nakamura & Partners. Process for preparing heat treated granular solid food. 4,882,188, Cl. 426-438.000.

Sawada, Tadashi: *See*—
Kanbara, Susumu; Aihara, Kenji; Tomiku, Masato; Kawashima, Yoshio; Sawada, Tadashi; Okuda, Shinji; and Ikeda, Mitsuaki, 4,881,987, Cl. 148-12.00B.

Sawyers, Craig G.: *See*—
North, John R.; Petty-Saphon, Satham; and Sawyers, Craig G., 4,882,288, Cl. 436-525.000.

Saxton, Jay R.; Sodt, Andrew J.; and Suslo, Dan J., to Transformer-CAD, Inc. Methods and systems for generating parametric designs. 4,882,692, Cl. 364-518.000.

Sayles, David C., to United States of America, Army. Signal or rescue flare of variable luminosity. 4,881,464, Cl. 102-336.000.

Scan Coin AB: *See*—
Goh, David; Moran-Iturralde, Anthony M.; and Howells, Geoffrey, 4,881,918, Cl. 453-4.000.

Schackelford, Carl L.: *See*—
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Schade, Jorg: *See*—
Oldengott, Michael; Schade, Jorg; and Stephan, Peter, 4,881,691, Cl. 241-101.500.

Schafer, Walter: *See*—
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Schallner, Otto: *See*—
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Scheller, Holger: *See*—
Spillane, Robert T.; Wyrick, Charles A.; Scheller, Holger; and Duval, Paul A., 4,881,383, Cl. 66-194.000.

Schenck, Terry G.: *See*—
Wright, Arthur P. G.; Wen, Betty P. L.; Schenck, Terry G.; and Maron, Antonina, 4,882,324, Cl. 514-191.000.

Schering Corporation: *See*—
McCombie, Stuart W.; Kirkup, Michael P.; and Boland, Amy Sommese, 4,882,429, Cl. 540-357.000.
Siegel, Marvin I.; and Smith, Sidney R., 4,882,332, Cl. 514-255.000.

Schertler, Siegried: *See*—
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Scheuble, Bernhard: *See*—
Eidenschink, Rudolf; Krause, Joachim; Hittich, Reinhard; Poetsch, Eike; Scheuble, Bernhard; Weber, Georg; and Pohl, Ludwig, 4,882,082, Cl. 252-299.610.

Scheuer, Paul J.: *See*—
Higa, Tatsuo; and Scheuer, Paul J., 4,882,445, Cl. 549-546.000.

Scheurer, Heinrich P.; and McNamee, Adrian G., to Warner-Lambert Company. Chewable, non-gritty calcium citrate tablet. 4,882,161, Cl. 424-441.000.

Schiemann, Wolfram. Plastics can. 4,881,647, Cl. 206-510.000.

Schiemann, Wolfram. Device suitable for use as a dual-chambered can. 4,881,652, Cl. 220-20.000.

Schirmer, Henry G., to W. R. Grace & Co. Method for making a vacuum skin package. 4,881,359, Cl. 53-427.000.

Schirmer, Ulrich: *See*—
Saupe, Thomas; Klebe, Gerhard; Schirmer, Ulrich; Paul, Gerhard; Kober, Reiner; Wuerzer, Bruno; Berghaus, Rainer; Meyer, Norbert; and Westphalen, Karl-Otto, 4,881,969, Cl. 71-94.000.

Schlager, Kenneth J., to Biotronics Associates, Inc. Non-invasive near infrared measurement of blood analyte concentrations. 4,882,492, Cl. 250-346.000.

Schleicher, Hans: *See*—
Goldhammer, Albert; Schleicher, Hans; Stangenberg, Hartmut; and Gasteier, Rolf, 4,881,692, Cl. 241-167.000.

Schlerf, David W.: *See*—
Wright, Diana R.; and Schlerf, David W., 4,881,562, Cl. 134-110.000.

Schlossman, Stuart; Morimoto, Chikao; and Rudd, Christopher, to Dana-Farber Cancer Institute, Inc. Activation antigen. 4,882,424, Cl. 530-387.000.

Schlumberger Technology Corporation: *See*—
Gordon, Dorothy A., 4,882,687, Cl. 364-518.000.

Schlunt, Richard S.: *See*—
Schmid, Hans-Peter; and Schlunt, Richard S., 4,882,668, Cl. 364-600.000.

Schmer, Gottfried, to Akzo NV. Dialysis membranes with improved compatibility. 4,882,060, Cl. 210-646.000.

Schmickl, Helfried, to U.S. Philips Corporation. Electrolytic capacitor and method for producing an electrolytic capacitor. 4,882,115, Cl. 361-538.000.

Schmid, Hans-Peter; and Schlunt, Richard S., to General Dynamics Corp., Pomona Division. Adaptive matched filter. 4,882,668, Cl. 364-600.000.

Schmid, Rudolf: *See*—
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Schmidt, Christoph; Schon, Rudolf; and Russ, Jurgen. Tubular flexible probe for introduction into the trachea and, respectively, into the bronchial system. 4,881,542, Cl. 128-207.140.

Schmidt, Robert R.: *See*—
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Schmidt, Theodore E.; and Peirish, Alfred J., to Pacific Security Systems of America, Inc. Lock mechanism. 4,881,766, Cl. 292-201.000.
Schmutzler, Werner: *See*—
Kaiser, Wolfgang; and Schmutzler, Werner, 4,882,742, Cl. 379-30.000.
Schnars, Michael J.: *See*—
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Schneider, Hans: *See*—
Hollenberg, Detlef; Schneider, Hans; and Weihrauch, Georg, 4,881,558, Cl. 132-112.000.
Schneider, Robert J.; and Shenk, Thomas E., to Princeton University. Amplified hybridization assay. 4,882,269, Cl. 435-6.000.
Schoeps, Wilfried: *See*—
Oba, Koichiro; Schoeps, Wilfried; and Taqqu, David, 4,882,480, Cl. 250-213.0VT.
Scholz, Eckhard-K.: *See*—
Henneken, Bernhard; Kammerling, Burno; Scholz, Eckhard-K.; Schroeder, Wolfgang; and Krause, Hans, 4,881,869, Cl. 414-786.000.
Schon, Rudolf: *See*—
Schmidt, Christoph; Schon, Rudolf; and Russ, Jurgen, 4,881,542, Cl. 128-207.140.
Schon, Stefan, to Elpatronic AG. Drive with overload safety coupling. 4,881,421, Cl. 74-412.0TA.
Schonenberger, Rolf: *See*—
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Henneken, Bernhard; Kammerling, Burno; Scholz, Eckhard-K.; Schroeder, Wolfgang; and Krause, Hans, 4,881,869, Cl. 414-786.000.
Schubel, Klaus-Dieter: *See*—
Markert, Jurgen; Schubel, Klaus-Dieter; and Krizek, Milan, 4,881,402, Cl. 73-61.00R.
Schubert, Erdmann; Ploog, Klaus; Fischer, Albrecht; and Horikoshi, Yoshiji, to Max-Planck Gesellschaft zur Forderung der Wissenschafter e.V. Semiconductor devices with at least one monoatomic layer of doping atoms. 4,882,609, Cl. 357-22.000.
Schuchard, Frank B.: *See*—
Finn, Jerome W.; Montgomery, Robert L.; and Schuchard, Frank B., 4,881,322, Cl. 29-878.000.
Schulz, Donald N.; Duvdevani, Ilan; Bock, Jan; and Berluche, Enock, to Exxon Research and Engineering Company. Terpolymers of acrylamide, alkylacrylamide and betaine monomers. 4,882,405, Cl. 526-265.000.
Schumacher, Hermann-Josef: *See*—
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Schutyser, Jan A. J.; and Buser, Antonius J. W., to Akzo N.V. Carrier material for use in chromatography or carrying out enzymatic reactions. 4,882,226, Cl. 428-407.000.
Schwartz, Edward M.; Morgan, Robert E.; and Everman, Wilburn D., to Edtech Company. Vertically adjustable, retrofittable workstation. 4,881,471, Cl. 108-144.000.
Schwarzwalder, Gottlob. Process and device for the fully automatic cleaning of spray guns fouled with paint or varnish. 4,881,561, Cl. 134-76.000.
Schweighardt, Frank K.; and Bailey, Webb L, to Air Products and Chemicals, Inc. Vapor phase soldering with perfluorinated butyl derivative compounds. 4,881,682, Cl. 228-242.000.
Scifres, Donald R.; and Burnham, Robert D., to Xerox Corporation. Quantum well heterostructure lasers with low current density threshold and higher T_O values. 4,882,734, Cl. 372-45.000.
Scott, Cheryl F.; and Colman, Robert W., to Temple University - of the Commonwealth System of Higher Education. High molecular weight kininogen assay. 4,882,272, Cl. 435-13.000.
Scott, Henry. Spinal traction and support unit used while seated. 4,881,528, Cl. 128-75.000.
Scott, James D.: *See*—
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Bogart, Larry; Hipkins, James J.; and Smith, Morris L., 4,882,221, Cl. 428-308.800.
Scripps Clinic and Research Foundation: *See*—
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Seidel, Jurgen; Rosenthal, Dieter; and Klockner, Jurgen, to SMS Schloemann-Siemag Aktiengesellschaft. Rolling mill stand with axially slidable rolls. 4,881,396, Cl. 72-247.000.
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Kimura, Ippo; Okumura, Naoyuki; Aruga, Tomoe; and Arai, Yoshio, 4,882,644, Cl. 360-104.000.
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Seki, Mitsuaki; Watanabe, Satoshi; and Miyakawa, Hideaki, to Cannon Kabushiki Kaisha; and Cannon Denshi Kabushiki Kaisha. Drive mechanism for a small-sized printer. 4,881,833, Cl. 400-185.000.
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Semple, Joseph E., to Du Pont de Nemours, E. I., and Company. Heterocyclic 2,3-dihydrobenzofuran herbicides. 4,881,967, Cl. 71-92.000.
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Senatore, Guy; Nesheiwat, Afif M.; and Sherk, Fred T., to Phillips Petroleum Company. Washing arylene sulfide polymers with water plus a reducing agent. 4,882,418, Cl. 528-499.000.
Sengoku, Masaharu, to Mitsubishi Denki Kabushiki Kaisha. Memory device including a rotating disk and means for detecting change in frictional resistance between the disk and a read/record head. 4,882,720, Cl. 369-47.000.
Serizawa, Minoru; and Tazuke, Yutaka, to Tokai Rubber Industries, Ltd.; and Toyota Jidosha Kabushiki Kaisha. Dual-type damper device. 4,881,426, Cl. 74-574.000.
Setaka, Yousuke; Yanase, Sumio; Takeuchi, Kanji; and Miyahara, Masahiko, to Nippondenso Co., Ltd. Torque detection apparatus. 4,881,414, Cl. 73-862.330.
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Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,158, Cl. 424-440.000.
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Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,151, Cl. 424-440.000.
Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,152, Cl. 424-440.000.
Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,153, Cl. 424-440.000.
Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,154, Cl. 424-440.000.
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Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,156, Cl. 424-440.000.
Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,157, Cl. 424-440.000.
Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,158, Cl. 424-440.000.
Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,159, Cl. 424-440.000.
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Shepard, Richard W.; Corban, Earle; and Preston, Peter, to Torrington Company, The. Split ring roller bearing cage. 4,881,830, Cl. 384-577.000.

Sherk, Fred T.: *See*—
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Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,153, Cl. 424-440.000.
Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,154, Cl. 424-440.000.
Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,155, Cl. 424-440.000.
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Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,157, Cl. 424-440.000.
Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,158, Cl. 424-440.000.
Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,159, Cl. 424-440.000.
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Shiells, Richard A.; and Falk, Gertrude, to University College London. Preventing ADP-ribosylation of G-proteins in a living subject. 4,882,146, Cl. 424-10.000.

Shigemasa, Takashi: *See*—
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Shih, Chuan; and Taylor, Edward C., to Trustess of Princeton University, The; and Eli Lilly and Company. N-(5,6,7,8-tetrahydropyrido[2,3-d]pyrimidin-6-yl-alkanoyl)-glutamic acid derivatives. 4,882,333, Cl. 514-258.000.

Shih, Chuan; and Taylor, Edward C., to Princeton University, The Trustees of; and Eli Lilly and Company. N-(5,6,7,8-tetrahydropyrido]2,3-d]pyrimidin-6-ylethl-thineyl-and furylcarbonyl)-glutamic acid derivatives. 4,882,334, Cl. 514-258.000.

Shiinoki, Yasuhiko: *See*—
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Shima, Kotaro; Ohba, Masaharu; and Nonaka, Masakatsu, to Toyota Jidosha Kabushiki Kaisha. Air suspension system with an air drier. 4,881,753, Cl. 280-707.000.

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Shimada, Masatoshi. Cordless telephone system. 4,882,746, Cl. 379-61.000.

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Shimamori, Tamotsu: *See*—
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Shimamune, takayuki; Hosonuma, Masashi; and Matsumoto, Yukiei, to Permelec Electrode Ltd. Process for the production of a titanium composite materials coated with calcium phosphate compound. 4,882,196, Cl. 427-2.000.

Shimamura, Akira, to Nisshin-DCA Foods, Inc. Process for preparing yeast raised doughnuts. 4,882,178, Cl. 426-27.000.

Shimizu, Atsushi: *See*—
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Shimizu, Norimitu; and Ikeda, Chikaho, to Fuji Xerox Co., Ltd. Color image reading apparatus with distributing type lens array and scan responsive shutters. 4,882,620, Cl. 358-75.000.

Shimizu, Takao: *See*—
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Miller, Phillip; Shindley, Richard P.; Feltz, Kristi T.; Hanson, George E.; and White, Jonathan R., 4,882,475, Cl. 235-383.000.

Shinjo, Katsumi, to Yugen Kaisha Shinjo Seisakusho; Matsui, Teruyuki; Matsuyama, Kikuma; and Saito, Toshisaida. Process and apparatus for fabricating stepped nails. 4,881,395, Cl. 72-90.000.

Shinjo, Kenji: *See*—
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Shinmyo, Saburo, to NEC Corporation. TDMA communication system having common time slots for system maintenance. 4,882,730, Cl. 370-95.200.

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Shinomiya, Masami, to Ohtsu Tire & Rubber Co., Ltd., The. All-terrain pneumatic tire. 4,881,586, Cl. 152-209.00B.

Shinsha, Takao; Morita, Masato; Sakataya, Yoshinori; Tsuchiya, Yoji; Hikosaka, Mitsuhiro; Koshishita. Junji; Akiyama, Keiho; and Kubo,

Takashige, to Hitachi, Ltd.; Hitachi Microcomputer Engineering, Ltd.; and Hitachi Software Engineering Co., Ltd. Incremental logic synthesis method. 4,882,690, Cl. 364-490.000.

Shinzawa, Motohiro; and Sekiya, Yoshiki, to Nissan Motor Co., Ltd. Diesel engine having shaped flame dispersing recess in piston crown. 4,881,501, Cl. 123-279.000.

Shioda, Yasuhiro; Nakamura, Shinya; Funahashi, Makoto; and Kubo, Seitoku, to Toyota Jidosha Kabushiki Kaisha. Accumulator piston having a coil spring secured thereto. 4,881,725, Cl. 267-179.000.

Shiokawa, Kozo; Tsuboi. Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, to Nihon Tokushu Noyaku Seizo K.K. Pyridylmethyl-4-thiazolines. 4,882,344, Cl. 514-342.000.

Shionogi & Co., Ltd.: *See*—
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Shippers Paper Products Company: *See*—
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Shirotori, Yozo, to Kabushiki Kaisha Sankyo Seiki Seisakusho. Disc drive motor. 4,882,643, Cl. 360-99.080.

Shiseido Company Ltd.: *See*—
Fukui, Hiroshi; Namba, Ryujiro; Saito, Tsutomu; Ohtsu, Yutaka; Kimura, Asa; Nakano, Motokiyo; Nakata, Okitsugu; Tommita, Kenichi; Tokubo, Kazuo; Ohno, Kazuhisa; Yoneyama, Toshio; Ogawa, Takashi; Morohoshi, Hideo; Koyama, Junichi; Kanda, Taketoshi; Kawaguchi, Kunihiro; and Shimizu, Yuzo, 4,882,225, Cl. 428-405.000.

Shivers, Clarence L. Passive ambience recovery system for the reproduction of sound. 4,882,753, Cl. 381-24.000.

Shofner, Frederick M., to PPM, Inc. Air filtration units and methods employing dust as filtration media and air flow rate as a directly controlled parameter. 4,881,957, Cl. 55-97.000.

Shogen, Kuslima; Mikulski, Stanislaw M.; and Ardelt, Wojciech J., to Alfacell Corporation. Pharmaceutical for treating tumors and method for making it. 4,882,421, Cl. 530-350.000.

Shoiket, Henry N.: *See*—
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Short Brothers PLC: *See*—
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Shugart, Steven A.: *See*—
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Siegal, Burton L., to Electro-Technic Products, Inc. Vacuum testing apparatus having a test enclosure with a rotatable sleeve. 4,882,543, Cl. 324-460.000.

Siegel, Marvin I.; and Smith, Sidney R., to Schering Corporation. Immune suppression method employing arly-substituted naphthyridine and pyridopyrazine derivatives. 4,882,332, Cl. 514-255.000.

Siegel, Paul H.: *See*—
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Siegl, Walter, to Sulzer Brothers Limited. Diesel engine simulator and a method of adjusting the dynamic running characteristics of a diesel engine. 4,881,404, Cl. 73-119.00A.

Siemens Aktiengesellschaft: *See*—
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Prodell, Peter, 4,882,662, Cl. 362-290.000.
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Silver, Alan H. Cordless headset telephone. 4,882,745, Cl. 379-61.000.

Silverman, Herbert P., to Rohrback Cosasco Systems, Inc. Method and apparatus for reducing interference in an electrical resistance probe during electrolytic plating. 4,882,537, Cl. 324-65.00R.

Simelunas, William J.; Polifroni, Nicholas R.; Shoiket, Henry N.; and Meyer, Stefan M., to Nabisco Brands, Inc. Method and apparatus for severing a coextrusion for making an enrobed food piece. 4,882,185, Cl. 426-283.000.

Simo, Miroslav A. Laterally adjustable replaceable arrow rest. 4,881,515, Cl. 124-24.00R.

Simon, Jaime; Garlich, Joseph R.; Wilson, David A.; and McMillan, Kenneth, to Dow Chemical Company, The. Bone marrow suppressing agents. 4,882,142, Cl. 424-1.220.

Simon, Theodore: *See*—
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Sinclair, Alan W., to Anamartic Limited. Data storage element and memory structures employing same. 4,882,706, Cl. 365-180.000.

Sinclair, John D., to Alko Limited. Method for treating alcohol-drinking response. 4,882,335, Cl. 514-282.000.

Singer, Paul A., to United States of America, Navy. 400 Hertz harmonic generator. 4,882,551, Cl. 331-78.000.

Singer, Richard E.: *See*—
Amos, Michael D.; Brosnan, Denis A.; Samas, Mark V.; Singer, Richard E.; Whetsel, James E.; and Kovarik, David P., 4,881,677, Cl. 228-33.000.

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SinghDeo, Narendra N.; Mahulikar, Deepak; and Butt, Sheldon H., to Olin Corporation. Electronic packaging of components incorporating a ceramic-glass-metal composite. 4,882,212, Cl. 428-76.000.

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Blech, Ilan A.; Gerzberg, Levy; Shacham, Yosef Y.; Sinar, Alexander; and Sirkin, Eric R., 4,882,611, Cl. 357-51.000.

Sitma-Societa Italiana Macchine Automatiche, S.p.A.: *See*—
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Sitrin, Robert D., to SmithKline Beckman Corporation. Carboxamide derivatives of glycopeptides. 4,882,313, Cl. 514-8.000.

Siwiak, Kazimierz, to Motorola, Inc. Code division multiplexed acknowledge back paging system. 4,882,579, Cl. 340-825.440.

Sjoo , Lennart: *See*—
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Skegin, Maer. Ventilated miniature lighting fixtures. 4,882,667, Cl. 362-373.000.

Skinner, James L., to Atlantic Richfield Company. Method and apparatus for treating oil-water-solids sludges and refinery waste streams. 4,881,473, Cl. 110-244.000.

Skinner, Malcolm E.: *See*—
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Skotheim, Terje A.; Okamoto, Yoshiyuki; and Lee, Hung S., to Polytechnic University; and Associated Universities, Inc. Preparation of metallic cation conducting polymers based on sterically hindered phenols containing polymeric systems. 4,882,243, Cl. 429-192.000.

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Slettebak, Richard J., to Boeing Company, The. Readily convertible aircraft passenger seats. 4,881,702, Cl. 244-118.600.

Slobodkin, Yefim, to Avery International Corporation. Method for constant pressure diagonal-web crush-scoring. 4,881,935, Cl. 493-355.000.

Slobodkin, Yefim, to Avery International Corporation. Apparatus for constant pressure diagonal web crush-scoring. 4,881,936, Cl. 493-355.000.

Smid, Johannes; Cabasso, Israel; Obligin, Alan; and Rawls, H. Ralph, to Research Foundation of State University of New York, The. Novel radiopaque heavy metal polymer complexes, compositions of matter and articles prepared therefrom. 4,882,392, Cl. 525-328.600.

Smiler, Mark G.; and Richard, John E., to Shamrock Industries, Inc. Security cassette holdr having integrally formed retaining ramps. 4,881,645, Cl. 206-387.000.

Smith, Charles W.; Butt, Sheldon H.; and Shapiro, Eugene, to Olin Corporation. Rigid magnetic recording disks and method of producing same. 4,882,236, Cl. 428-652.000.

Smith, Gaylord D.; and Tassen, Curtis S., to INCO Alloys International, Inc. Sulfidation/oxidation resistant alloys. 4,882,125, Cl. 420-443.000.

Smith, John D.; and Vanes, Stephen E., to Lucas Industries Public Limited Company. Manufacture of corrosion resistant components. 4,881,983, Cl. 148-16.600.

Smith, Kevin K.; Allsop, Bryan E.; and Naik, Seb, to Tektronix, Inc. Thermally stabilized optical preamplifier. 4,882,482, Cl. 250-214.00A.

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Smith, Richard J. Shower head dispensing fixture. 4,881,575, Cl. 137-889.000.

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Smith, Theoren P., III, to International Business Machines Corporation. Multilayer semiconductor device having multiple paths of current flow. 4,882,608, Cl. 357-22.000.
Smith, Wayne D. Apparatus for deployment of aerial-drop units. 4,881,601, Cl. 169-53.000.
Smith, William W.; and Knowles, Steven C., to Olin Corporation. Arcjet thruster with improved arc attachment for enhancement of efficiency. 4,882,465, Cl. 219-121.480.
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Sohngen, Gary W. Intramedullary rod targeting device. 4,881,535, Cl. 606-98.000.
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Sonobe, Kozo; Fukuzawa, Takashi; Takeuchi, Kohsuke; Tabata, Tatushi; Fukuoka, Hiroshi; Hisamatsu, Kunio; and Katamura, Makoto, to Nippon Chemical Industrial Co., Ltd. Modified steel slag and method of manufacturing the same. 4,882,303, Cl. 501-28.000.
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Stoppazzini, Benito, to E.M.M. Emiliana Macchine Maglieria S.R.L. Electromechanical device for drawing along slides supporting the same number of thread guides in an automatic flat knitting machine. 4,881,382, Cl. 66-126.00R.

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Stroh, Alvin L.; and Pilon, Terry C., to McMillin Wire & Plating, Inc.; and Challenge Bag California, Inc. Method of forming cantilevered support arms for plastic bag rack. 4,881,577, Cl. 140-71.00R.

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Sudholter, Ernst J.; Skowronska-Ptasinska, Maria D.; Van der Wal, Peter D.; Van den Berg, Albert; and Reinhoudt, David N., to Stichting Centrum voor Micro-Elektronics Twente. Process for manufacturing a REFET or a CHEMFET, and the manufactured REFET or CHEMFET. 4,882,292, Cl. 437-42.000.

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Sugiyama, Kazuhiro: *See—*
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Sumitomo Metal Industries, Ltd.: *See—*
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Sumitomo Metal Mining Co., Ltd.: *See—*
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Sumiyoshi, Hajime, to Kabushiki Kaisha Toshiba. Synchronizing signal separation circuit for a television receiver. 4,882,624, Cl. 358-153.000.

Sun Chemical Corporation: *See—*
Kveglis, Albert A.; and Gruben, Arnold H., 4,882,436, Cl. 548-354.000.

Sun Hill Industries, Inc.: *See—*
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Sundquist, Stephen K.: *See—*
Timm, Gerald W.; and Sundquist, Stephen K., 4,881,531, Cl. 128-79.000.

Sundstrand Corporation: *See—*
Flygare, Wayne A.; Olson, Raymond N.; Reynolds, Richard W.; and Aleem, Mohd A., 4,882,513, Cl. 310-114.000.
Roe, Derrick I.; Rozman, Christopher J.; and Recker, Bradley J., 4,882,120, Cl. 363-98.000.

Sundstrand Data Control, Inc.: *See—*
Hulsing, Rand H., II; Peters, Rex B.; and Norling, Brian L., 4,881,408, Cl. 73-517.0AV.

Sunstar Engineering Inc.: *See—*
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Suntory Limited: *See—*
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Suratco Products Company: *See—*
Stamstad, Robert E., 4,882,055, Cl. 210-483.000.

Suslo, Dan J.: *See—*
Saxton, Jay R.; Sodt, Andrew J.; and Suslo, Dan J., 4,882,692, Cl. 364-518.000.

Sutter, Hubert: *See—*
Herwig, Jens; Kolwert, Alois; Sutter, Hubert; and Woltjes, Dieter, 4,882,393, Cl. 525-330.200.

Suttles, J. Marshall, to Royston Corporation. Jumbo cup dispenser. 4,881,660, Cl. 221-44.000.

Suzuki, Akio; and Takada, Yoshihiro, to Canon Kabushiki Kaisha. Color image recording apparatus. 4,882,621, Cl. 358-80.000.

Suzuki, Eiichiro: *See—*
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Suzuki, Hiroko: *See—*
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Suzuki, Kazuo: *See*—
Takao, Shoji; Nakashima, Hiroshi; Watanabe, Makoto; Saitoh, Makoto; Chiba, Kyoko; and Suzuki, Kazuo, 4,882,180, Cl. 426-46.000.
Suzuki, Motoyuki; and Deguchi, Yukichi, to Toray Industries. Capacitor. 4,882,653, Cl. 361-323.000.
Suzuki, Seikoo; Miki, Masayuki; Sasayama, Takao; Osuga, Minoru; and Oyama, Yoshishige, to Hitachi, Ltd. Air-fuel ratio detection system for engine exhaust gas. 4,882,030, Cl. 204-406.000.
Suzuki, Shinji; Arai, Tetsuji; Ueki, Kazuyoshi; Mimura, Yoshiki; and Suzuki, Hiroko, to Usho Denki. Method of treating photoresists. 4,882,263, Cl. 430-328.000.
Suzuki, Tadasu, to Tsubakimoto Chain Company. Fluidic tensioner. 4,881,927, Cl. 474-110.000.
Suzuki, Takashi, to NEC Corporation. Clock control system. 4,882,738, Cl. 375-108.000.
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Suzuki, Teruo: *See*—
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Swan, Richard L. Reinforced cold weather sports glove. 4,881,276, Cl. 2-161.00A.
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Sweet, Randall P.; Miller, Patrick J.; and Metevia, Virgil L., to Dow Corning Corporation. Low-viscosity pressure-adherent silicone elastomer compositions. 4,882,377, Cl. 524-267.000.
SWF Auto-Electric GmbH: *See*—
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Szegvari, Zsuzsanna: *See*—
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Tack, Robert D.; and Lewtas, Kenneth, to Exxon Chemical Patents Inc. Crude oil or fuel oil compositions. 4,882,034, Cl. 208-15.000.
Taeusch, H. William; Jacobs, Kenneth A.; Steinbrink, D. Randall; Floros, Joanna; Phelps, David S.; and Fritsch, Edward F., to Genetics Institute, Inc. Pulmonary surfactant proteins. 4,882,422, Cl. 530-350.000.
Taguchi, Fumiaki; Mitsui, Isamu; Hara, Kinichi; Hayashi, Masaro; Ezawa, Kunio; Fukunaga, Kenichi; and Kuranari, Jun, to Calpis Food Industry; and Taguchi, Fumiaki. Substance-conjugated complement component C1q. 4,882,423, Cl. 530-380.000.
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Takano, Shigemasa: *See*—
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Takao, Shoji; Nakashima, Hiroshi; Watanabe, Makoto; Saitoh, Makoto; Chiba, Kyoko; and Suzuki, Kazuo, to Terumo Kabushiki Kaisha. Soybean hydrolyzate. 4,882,180, Cl. 426-46.000.
Takasaki, Yoshimi; Yamaguchi, Akira; and Yoshimura, Ryoichi, to Fuji Photo Film Co., Ltd. Light beam scanning apparatus having two detectors whose signal ratio indicates main scanning position. 4,882,490, Cl. 250-236.000.
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Takashio, Masachika; Chikano, Takahide; and Kamimura, Minoru, to Sapporo Breweries Limited. Uricase and a method for the preparation thereof. 4,882,280, Cl. 435-228.000.
Takasuka, Koji; and Ibuki, Koji, to Mitsubishi Denki Kabushiki Kaisha. Apparatus for detecting position of internal fault of gas insulated bus. 4,882,682, Cl. 364-507.000.
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Takayanagi, Makoto, to Aisin Seiki Kabushiki Kaisha. Solenoid assembly. 4,882,558, Cl. 335-260.000.
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Terashima, Kanetsugu; Ichihashi, Mitsuyoshi; Kikuchi, Makoto; Takeshita, Fusayuki; and Furukawa, Kenji, 4,882,086, Cl. 252-299.610.
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Takimoto, Hideo; Tokuda, Katsuji; and Yamamoto, Koji, to Kashima Industries Co. Epoxy resin film covered with metal foil and flexible printed wiring board. 4,882,216, Cl. 428-209.000.

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Talley, Arthur, Jr.; and Wilkie, Arnold E., to Monsanto Company. Carpet fiber blends. 4,882,222, Cl. 428-362.000.

Tallman, Gary C. Dispensing spout. 4,881,662, Cl. 222-81.000.

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Tamura, Yukitoshi; and Takamatsu, Keiji, to Sumitomo Metal Mining Co., Ltd. Infrared detector. 4,882,491, Cl. 250-338.300.

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Tanaka, Fumio; and DeWitt, David P., to Purdue Research Foundation. Radiation thermometry. 4,881,823, Cl. 374-126.000.

Tanaka, Hatsuyuki: *See*—
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Tanaka, Hiromasa, to Honda Giken Kogyo Kabushiki Kaisha. Independent rear wheel suspension system. 4,881,752, Cl. 280-690.000.

Tanaka, Hiromi: *See*—
Ono, Akira; Fuse, Toshikazu; Miyamoto, Osamu; Makino, Shoso; Yamato, Yoshihisa; Kametani, Hiroshi; Tokura, Susumu; Tanaka, Hiromi; Ito, Toru; Nakao, Hitomi; Tokuoka, Shuji; and Takeda, Toshihide, 4,882,220, Cl. 428-240.000.

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Tanaka, Masatoshi, to Hitachi Medical Corporation. Scintillation camera. 4,882,495, Cl. 250-363.090.

Tanaka, Takashi; Imura, Satoshi; and Kida, Yasuji, to Tokuyama Soda Kabushiki Kaisha. Photochromatic compounds. 4,882,438, Cl. 548-407.000.

Tanaka, Toshihiko: *See*—
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Tanaka, Yoshihiro; Tsuji, Sadafusa; Hata, Yoshiaki; Inoue, Manabu; Ootsuka, Hiroshi; Iwata, Michihiro; Ishito, Fumiaki; and Hayama, Koh, to Minolta Camera Kabushiki Kaisha. Photographic camera having a piezo-electric actuating element. 4,882,602, Cl. 354-457.000.

Tanaka, Yutaka; and Fukuda, Kenji, to Nitto Kohki Co., Ltd. Machine for chamfering the corner of an object to be processed. 4,881,857, Cl. 409-138.000.

Tanigawa, Hiroshi, to NEC Corporation. Object detecting system using ultrasonic waves. 4,882,714, Cl. 367-103.000.

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Taniguchi, Mitsuyuki: *See*—
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Taniguchi, Nishinomiya; Ishida, Tokuji; Norita, Toshio; Hamada, Masataka; and Karasaki, Toshihiko, to Minolta Camera Kabushiki Kaisha. Camera with an automatic focusing device. 4,882,601, Cl. 354-407.000.

Tanner, Robert M., to Ford Aerospace Corporation. Method and apparatus for combining encoding and modulation. 4,882,733, Cl. 371-43.000.

Taqqu, David: *See*—
Oba, Koichiro; Schoeps, Wilfried; and Taqqu, David, 4,882,480, Cl. 250-213.0VT.

Tarbox, Eleanor J., to Pirelli General plc. Optical fibre attenuators and method for making same. 4,881,793, Cl. 350-96.210.

Tashahashi, Minoru; Tokuda, Hiroastu; Watanabe, Izumi; and Nishimura, Yutaka, to Hitachi, Ltd.; and Hitachi Automotive Engineering Co., Ltd. Hot wire air flow meter. 4,881,407, Cl. 73-204.160.

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Tassi, Lamberto: *See*—
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Tateoka, Hitoshi; and Uchino, Fumio, to Olympus Optical Co., Ltd. Acoustic lens for use in acoustic microscope. 4,881,618, Cl. 181-176.000.

Tatsumi, Yuuichi; Minagawa, Hidenobu; Iwahashi, Hiroshi; Asano, Masamichi; and Imai, Mizuho, to Kabushiki Kaisha Toshiba. Output circuit of semiconductor integrated circuit device. 4,882,507, Cl. 307-443.000.

Tayler, Gerald E.; and Wagner, Robert E., to International Business Machines Corporation. Sequentially processing data in a cached data storage system. 4,882,642, Cl. 360-78.110.

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Taylor, Edward C.: *See*—
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Shih, Chuan; and Taylor, Edward C., 4,882,334, Cl. 514-258.000.

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Taylor, Robert E.: *See*—
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Tecnoma: *See*—
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Tecnomare S.p.A.: *See*—
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Tecumseh Products Company: *See*—
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Teknion Furniture Systems Inc.: *See*—
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Tektronix, Inc.: *See*—
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Teleflex Incorporated: *See*—
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Temperilli, Aldemio: *See*—
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Temple, Michael D.; Seddon, Richard I.; and Johnson, Kim L., to Optical Coating Laboratory, Inc. System and method for vacuum deposition of thin films. 4,882,198, Cl. 427-38.000.

Temple University - of the Commonwealth System of Higher Education: *See*—
Scott, Cheryl F.; and Colman, Robert W., 4,882,272, Cl. 435-13.000.

Temtec Fahrzeugtechnik Entwicklungsgesellschaft mbH: *See*—
Jansky, Jaroslav; and Temmesfeld, Angelika, 4,881,655, Cl. 220-209.000.

Tenenbaum, Harvey. Diaper spray. 4,882,204, Cl. 427-180.000.

Tennant Trend Inc.: *See*—
May, Barry A.; and Armstrong, James, 4,881,288, Cl. 15-98.000.

Terai, Akio; Yoshino, Junichi; Satsumi, Shinroku; and Taniguchi, Mitsuru, to Kamatsu Zenoah, Co. Mowing machine. 4,881,363, Cl. 56-255.000.

Teranishi, Mitsuji; Watanabe, Yasuo; and Takeuchi, Akira, to Asics Corporation. Communication system. 4,882,580, Cl. 340-825.510.

Terashima, Kanetsugu; Ichihashi, Mitsuyoshi; Takeshita, Fusayuki; Kikuchi, Makoto; and Furukawa, Kenji, to Chisso Corporation. Smectic liquid crystal mixture. 4,882,083, Cl. 252-299.610.

Terashima, Kanetsugu; Ichihashi, Mitsuyoshi; Kikuchi, Makoto; Takeshita, Fusayuki; and Furukawa, Kenji, to Chisso Corporation. Ferroelectric liquid crystal composition. 4,882,086, Cl. 252-299.610.

Terumo Kabushiki Kaisha: *See*—
Takao, Shoji; Nakashima, Hiroshi; Watanabe, Makoto; Saitoh, Makoto; Chiba, Kyoko; and Suzuki, Kazuo, 4,882,180, Cl. 426-46.000.

Tesoro, Giuliana C.; and Sastri, Vinod R., to Polytechnic University. Epoxy resins having reversible crosslinks. 4,882,399, Cl. 525-523.000.

Teurlings, Luc. Variance wrist brace. 4,881,533, Cl. 128-87.00R.

Texas Instruments Deutschland GmbH: *See*—
Naumann, Jorg; Sharnagl, Thomas; and Stroth, Leo, 4,882,293, Cl. 437-52.000.

Texas Instruments Incorporated: *See*—
Ayers, Joe W., 4,881,922, Cl. 464-79.000.
Brubaker, William B.; Slaughter, John; Christian, Donald J.; and Doty, Thomas J., 4,882,694, Cl. 364-424.020.
Chen, Ih-Chin; Shen, Bing W.; and Doering, Robert R., 4,882,649, Cl. 361-313.000.
Fisher, William M.; McMahan, Michael L.; Doddington, George; and Bocchieri, Enrico L., 4,882,757, Cl. 381-43.000.
Freeman, Dean W.; and Burris, James B., 4,882,299, Cl. 437-233.000.
Garza, Cesar M.; Douglas, Monte A.; Loewenstein, Lee M.; and Davis, Cecil J., 4,882,008, Cl. 156-643.000.
Grimm, Thomas R., 4,881,839, Cl. 400-692.000.
Hashimoto, Masashi; Kenji, Sasaki; and Nomura, Masayoshi, 4,882,710, Cl. 365-189.050.
Peterson, Robert K.; Mowatt, Larry J.; and Poteet, Aaron D., 4,882,454, Cl. 174-68.500.
Rendon, Mark A.; Treszoks, Erik A.; and Grimm, Thomas R., 4,881,840, Cl. 400-705.100.
Van Den Elst, Fredrik M. N.; and Bakker, Jan, 4,881,508, Cl. 123-549.000.

Thaisrivongs, Suvit, to Upjohn Company, The. Dihalo-statine substituted renin inhibitors. 4,882,420, Cl. 530-330.000.

Theiler, Jane B.: *See*—
Izzo, Henry J.; Pincus, Stephen M.; Theiler, Jane B.; and Cirigliano, Michael C., 4,882,187, Cl. 426-335.000.

Theurer, Josef, to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H. Continuously advancing track maintenance or rehabilitation machine. 4,881,467, Cl. 104-7.200.

Theus, Ulrich; and Giebel, Burkhard, to Deutsche ITT Industries GmbH. Protective arrangement for MOS circuits. 4,882,610, Cl. 357-23.130.

Thevenin, Nicole: *See*—
Born, Maurice; Lallement, Jacques; Marchand, Pierre; Parc, Guy; and Thevenin, Nicole, 4,882,446, Cl. 556-25.000.

Thiel, Gerhard: *See*—
Quittkat, Joerg; and Thiel, Gerhard, 4,882,539, Cl. 324-229.000.

Thierry, Bomer, to Matra. Method and device for measuring distance optically. 4,881,809, Cl. 356-5.000.

Thom, Michael J. Refining of lead-debismuthizing. 4,881,971, Cl. 75-78.000.

Thoma, Paul E.; AbuJodom, David N., II; and Fariabi, Sepehr, to Johnson Service Company. Method for producing a shape memory alloy member having specific physical and mechanical properties. 4,881,981, Cl. 148-11.50R.

Thomas, Gareth J.: *See*—
Lambert, Robert W.; Martin, Joseph A.; and Thomas, Gareth J., 4,882,316, Cl. 514-49.000.

Thomas J. Lipton Inc.: *See*—
Izzo, Henry J.; Pincus, Stephen M.; Theiler, Jane B.; and Cirigliano, Michael C., 4,882,187, Cl. 426-335.000.

Thomas, Peter J.: *See*—
Thompson, Noel E.; Johns, Richard Martin; Rozmus, Gregory; Voss, George F.; Edwards, William J.; and Thomas, Peter J., 4,881,392, Cl. 72-7.000.

Thommen, Robert L.; and Parker, Eric B., to Specialty Connector Company, Inc. High voltage coaxial connector. 4,881,912, Cl. 439-585.000.

Thompson Corrugated Systems, Inc.: *See*—
Thompson, Frederick H., 4,882,005, Cl. 156-470.000.

Thompson, Frederick H., to Thompson Corrugated Systems, Inc. Device for making laminated arch corrugated structures. 4,882,005, Cl. 156-470.000.

Thompson, Mark E., to Du Pont de Nemours, E. I., and Company. Herbicidal sulfonamides. 4,881,968, Cl. 71-92.000.

Thompson, Noel E.; Johns, Richard Martin; Rozmus, Gregory; Voss, George F.; Edwards, William J.; and Thomas, Peter J., to Broken Hill Proprietary Company Limited; and Industrial Automation Services Pty Ltd. Hot leveller automation system. 4,881,392, Cl. 72-7.000.

Thomson-CSF: *See*—
Lefevre, Herve; Rojas, Dominique; and Turpin, Marc, 4,882,716, Cl. 367-149.000.

Thornton, George B.; Moriarty, Ann M.; Milich, David R.; and McLachlan, Alan, to Scripps Clinic and Research Foundation. T cell epitopes of the hepatitis B virus nucleocapsid protein. 4,882,145, Cl. 424-88.000.

Those Characters From Cleveland, Inc.: *See*—
Randleman, Randy J., 4,881,843, Cl. 403-92.000.

Ticu, Adriana E.: *See*—
Bugg, Brian J.; Martin, Glenn E.; Oberg, David J.; and Ticu, Adriana E., 4,882,003, Cl. 156-315.000.

Tietema, James R.: *See*—
Stockinger, Michael P.; Tietema, James R.; and Bass, Lee S., 4,881,598, Cl. 166-250.000.

Tigyi, Gabor; Bozoky, Bela; Szegvari, Zsuzsanna; Frank, Tibor; Hajos, Gyorgy; Szporny, Laszlo; and Forgacs, Lilla, to Richter Gedeon Vegyeszeti Gyar Rt. Method and pharmaceutical composition for treating leukoencephalitic demyelinization clinical patterns of autoimmune origin, particularly multiple sclerosis. 4,882,336, Cl. 514-283.000.

Timm, Gerald W.; and Sundquist, Stephen K., to Dacomed Corporation. Position stable segmented column penile prosthesis. 4,881,531, Cl. 128-79.000.

Timmermann, Donald N.: *See*—
Pokrandt, Glenn C.; Busser, William F.; Timmermann, Donald N.; and Kuliga, Thomas N., 4,881,921, Cl. 464-54.000.

Ting, Sai-Pei, to General Electric Co. Impact modified poly(alkenyl aromatic) resin compositions. 4,882,383, Cl. 525-71.000.

Tison, Richard P., to General Motors Corporation. Electrolytic demetallization of dilute solutions using ion exchange resins. 4,882,018, Cl. 204-105.00R.

Tiwari, Basant L., to General Motors Corporation. Hydrogen probe. 4,882,032, Cl. 204-422.000.

Tobing, Singa D. Co-curing of NR/EPDM rubber bands. 4,882,387, Cl. 525-194.000.

Toelke, Peter; and Greulich, Walter, to Georg Fischer AG. Process for the production of a composite camshaft. 4,881,680, Cl. 228-182.000.

Tohatsu Corporation: *See*—
Hamanaka, Tamotsu, 4,881,513, Cl. 123-664.000.

Toho Kinzoku Co., Ltd.: *See*—
Maeno, Yoshinori; Mikita, Hiroshi; Umezu, Sadao; Matsuda, Fukuhisa; and Ushio, Masao, 4,882,519, Cl. 313-633.000.

Tohoku Dotetsu Kabushiki Kaisha: *See*—
Matsubara, Yasushi; Miyagawa, Minoru; and Takahashi, Masanori, 4,882,371, Cl. 523-406.000.

Toja, Emilio; Gorini, Carlo; Barzaghi, Fernando; and Galliani, Giulio, to Roussel Uclaf. Derivatives of 1-benzyl-2-oxo-5-alkoxy-pyrrolidine, and medicament compositions containing them. 4,882,350, Cl. 514-425.000.

Tokai Rubber Industries, Ltd.: *See*—
Ohkita, Katsuhiko; Ogata, Kazuhiro; and Niwa, Ken, 4,882,101, Cl. 264-26.000.
Serizawa, Minoru; and Tazuke, Yutaka, 4,881,426, Cl. 74-574.000.

Tokin Corporation: *See*—
Sato, Tadakuni; and Tachiya, Yuichi, 4,881,986, Cl. 148-103.000.

Tokoli, Emery G.: *See*—
Loutfy, Rafik O.; Hor, Ah-Mee; Liebermann, George; Toth, Alan J; Hsiao, Cheng-Kuo; Carmichael, Kathleen M.; and Tokoli, Emery G., 4,882,254, Cl. 430-59.000.

Tokubo, Kazuo: *See*—
Fukui, Hiroshi; Namba, Ryujiro; Saito, Tsutomu; Ohtsu, Yutaka; Kimura, Asa; Nakano, Motokiyo; Nakata, Okitsugu; Tommita, Kenichi; Tokubo, Kazuo; Ohno, Kazuhisa; Yoneyama, Toshio; Ogawa, Takashi; Morohoshi, Hideo; Koyama, Junichi; Kanda, Taketoshi; Kawaguchi, Kunihiro; and Shimizu, Yuzo, 4,882,225, Cl. 428-405.000.

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Tokuoka, Shuji: *See*—
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Tokura, Susumu: *See*—
Ono, Akira; Fuse, Toshikazu; Miyamoto, Osamu; Makino, Shoso; Yamato, Yoshihisa; Kametani, Hiroshi; Tokura, Susumu; Tanaka, Hiromi; Ito, Toru; Nakao, Hitomi; Tokuoka, Shuji; and Takeda, Toshihide, 4,882,220, Cl. 428-240.000.

Tokutake, Nobuo: *See*—
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Tokuyama Soda Kabushiki Kaisha: *See*—
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Tokyo Boeki Ltd.: *See*—
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Tokyo Electric Co., Ltd.: *See*—
Mine, Kazunori; Murakami, Keisuke; and Urata, Hiromasa, 4,882,631, Cl. 358-471.000.

Tokyo Gas Kabushiki Kaisha: *See*—
Zenbayashi, Katsuaki; Otsuga, Hisao; Morinaga, Akio; Toyoshima, Osamu; and Shimokawa, Shinji, 4,882,470, Cl. 219-523.000.

Tokyo Metal Co., Ltd.: *See*—
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Tokyo Ohka Kogyo Co., Ltd.: *See*—
Kohara, Hidekatsu; Tokutake, Nobuo; Miyabe, Masanori; Nakayama, Toshimasa; Asaumi, Shingo; Tanaka, Hatsuyuki; and Arai, Yoshiaki, 4,882,260, Cl. 430-191.000.

Tolman, Richard L.: *See*—
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Tomaszewski, Isabel B.: *See*—
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Tomii, Yoshifumi: *See*—
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Tomiku, Masato: *See*—
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Tomisawa, Naoki, to Japan Electronic Control Systems Co., Ltd. Electronic learning control apparatus for internal combustion engine. 4,881,505, Cl. 123-480.000.

Tomita, Masahiro; and Yasuda, Eturo, to Nippon Soken, Inc. Piezoelectric ceramic materials. 4,882,079, Cl. 252-62.900.

Tomlinson, Roderick P. J.: *See*—
Halls, Neil G.; and Tomlinson, Roderick P. J., 4,882,182, Cl. 426-116.000.

Tommita, Kenichi: *See*—
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Tonsor, Andrew J., to Caterpillar Inc. Tensioning and recoil system for a tracked vehicle. 4,881,786, Cl. 305-10.000.

Toppan Printing Co., Ltd.: *See*—
Uzuda, Tetsuji; Kuramoto, Takashi; Onga, Takeo; Suzuki, Teruo; Koizumi, Masaru; and Kondo, Takeo, 4,882,622, Cl. 358-80.000.

Toray Industries: *See*—
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Torcomian, Albert, to LHT Industries, Inc. Articulated truck/trailer combination: second cargo unit coupling mechanism. 4,881,751, Cl. 280-457.000.

Tornare, Jean; and Bofinger, Klaus, to Cryomec AG. Device for vaporizing a cryogenic fluid. 4,881,495, Cl. 123-41.310.

Torrington Company, The: *See*—
Shepard, Richard W.; Corban, Earle; and Preston, Peter, 4,881,830, Cl. 384-577.000.

Toshiba Chemical Corporation: *See*—
Iwase, Hidehiro; and Habata, Keiichi, 4,882,227, Cl. 428-407.000.

Toshiba Silicone Co., Ltd.: *See*—
Nagaoka, Hisayuki; and Zenbayashi, Michio, 4,882,396, Cl. 525-426.000.

Toth, Alan J: *See*—
Loutfy, Rafik O.; Hor, Ah-Mee; Liebermann, George; Toth, Alan J; Hsiao, Cheng-Kuo; Carmichael, Kathleen M.; and Tokoli, Emery G., 4,882,254, Cl. 430-59.000.

Totsune, Atsushi: *See*—
Sato, Hiromitsu; Kubota, Shinichi; Totsune, Atsushi; and Asakura, Masahiko, 4,882,538, Cl. 324-127.000.

Touma, Kouichi; Hasegawa, Tetsuo; Kushida, Naoki; Yaegashi, Hisao; Tamura, Yasuyuki; and Kaneko, Shuzo, to Canon Kabushiki Kaisha. Method and apparatus for carrying out transference recording of an ink image. 4,882,593, Cl. 346-111.000.

Townsend, Irving. Textile fabric. 4,881,381, Cl. 66-1.00A.

Toyo Ink Manufacturing Co., Ltd.: *See*—
Enokida, Toshio; and Takano, Shigemasa, 4,882,427, Cl. 540-141.000.

Toyoda Iron Works Co., Ltd.: *See*—
Kanno, Kimio, 4,881,425, Cl. 74-538.000.

Toyoshima, Osamu: *See*—
Zenbayashi, Katsuaki; Otsuga, Hisao; Morinaga, Akio; Toyoshima, Osamu; and Shimokawa, Shinji, 4,882,470, Cl. 219-523.000.

Toyota Jidosha Kabushiki Kaisha: *See*—
Demura, Takayuki; and Igarashi, Kohei, 4,881,368, Cl. 60-274.000.
Kabune, Hideki; Kamiya, Kohji; Miyake, Kiyoshi; Saito, Shigeru; Yamada, Shinichi; and Asami, Ken, 4,882,530, Cl. 318-696.000.
Ohashi, Michihiro; and Nakamura, Norio, 4,881,509, Cl. 123-571.000.
Serizawa, Minoru; and Tazuke, Yutaka, 4,881,426, Cl. 74-574.000.
Shima, Kotaro; Ohba, Masaharu; and Nonaka, Masakatsu, 4,881,753, Cl. 280-707.000.
Shioda, Yasuhiro; Nakamura, Shinya; Funahashi, Makoto; and Kubo, Seitoku, 4,881,725, Cl. 267-179.000.

Toyota, Tomohiro: *See*—
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Tracor, Inc.: *See*—
Duryea, Anthony N., 4,882,485, Cl. 250-288.000.

Trakas, Panos. Internally heated sprue bushing assembly with a unitary bushing casing core element. 4,882,469, Cl. 219-421.000.

TransformerCAD, Inc.: *See*—
Saxton, Jay R.; Sodt, Andrew J.; and Suslo, Dan J., 4,882,692, Cl. 364-518.000.

Traquandi, Gabriella: *See*—
Chicchini, Laura; Gobbini, Mauro; Mantegani, Sergio; Ruggieri, Daniel; Temperilli, Aldemio; Traquandi, Gabriella; and Ferrari, Patrizia, 4,882,315, Cl. 514-26.000.

Traster, Elden D.: *See*—
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Tremblay, Robert L. Clip device to attach a backsplash to a countertop. 4,881,844, Cl. 403-407.100.

Trembly, B. Stuart; and Crump, Ralph E., to Massachusetts Institute of Technology. Combined microwave heating and surface cooling of the cornea. 4,881,543, Cl. 128-303.100.

Treszoks, Erik A.: *See*—
Rendon, Mark A.; Treszoks, Erik A.; and Grimm, Thomas R., 4,881,840, Cl. 400-705.100.

Triangle Tool Corporation: *See*—
Luther, LeRoy D., 4,881,891, Cl. 425-556.000.

Trick, Robert E., to Medical Engineering Corporation. Penile prosthesis. 4,881,530, Cl. 128-79.000.

Trinity Industries, Inc.: *See*—
Yates, Donald B.; and Przbylinski, Phillip G., 4,881,470, Cl. 105-165.000.

Trinquet, Gilles: *See*—
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Troiano, Thomas, to Troiano, Thomas. Cable actuating assembly. 4,881,423, Cl. 74-501.600.

Trueba, Kenneth E.; Knight, William R.; and Nielsen, Niels J., to Hewlett-Packard Company. Hydraulically tuned channel architecture. 4,882,595, Cl. 346-140.00R.

Trumpfheller, Gunter: *See*—
Hoferer, Richard; Klotz, Arthur; Lehmann, Volker; and Trumpfheller, Gunter, 4,881,292, Cl. 16-2.000.

Trustess of Princeton University, The: *See*—
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TRW United Carr GmbH: *See*—
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Trygstad, Joyce C.: *See*—
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Tsai, Lii-Chyuan: *See*—
Liu, Jonq-Min; Chen, Tai-Jun; Tsai, Lii-Chyuan; and Pai, Li-Wen, 4,882,250, Cl. 430-58.000.

Tsao, Ying-Yen P., to Mobil Oil Corporation. Process for preparing noble metal-containing zeolites. 4,882,307, Cl. 502-66.000.

Tsubakimoto Chain Company: *See*—
Suzuki, Tadasu, 4,881,927, Cl. 474-110.000.

Tsuboi, Shinichi: *See*—
Shiokawa, Kozo; Tsuboi, Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, 4,882,344, Cl. 514-342.000.

Tsuboyama, Akira: *See*—
Yoshinaga, Kazuo; Katagiri, Kazuharu; Tsuboyama, Akira; Kitayama, Hiroyuki; Shinjo, Kenji; and Hioki, Chieko, 4,882,085, Cl. 252-299.610.

Tsuchida, Shinya: *See*—
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Tsuchiya, Yoji: *See*—
Shinsha, Takao; Morita, Masato; Sakataya, Yoshinori; Tsuchiya, Yoji; Hikosaka, Mitsuhiro; Koshishita, Junji; Akiyama, Keiho; and Kubo, Takashige, 4,882,690, Cl. 364-490.000.

Tsuji, Kiyoshi: *See*—
Hasegawa, Akira; Takahashi, Susumu; Tsuji, Kiyoshi; Nishioka, Kimihiko; and Matsui, Hiroshi, 4,882,619, Cl. 358-55.000.

Tsuji, Masaki, to Kabushiki Kaisha Toshiba. FM signal demodulator for video signal reproducing apparatus. 4,882,618, Cl. 358-167.000.

Tsuji, Sadafusa: *See*—
Tanaka, Yoshihiro; Tsuji, Sadafusa; Hata, Yoshiaki; Inoue, Manabu; Ootsuka, Hiroshi; Iwata, Michihiro; Ishito, Fumiaki; and Hayama, Koh, 4,882,602, Cl. 354-457.000.

Tsuji, Yasunori: *See*—
Yamaguchi, Hideya; Hayasaki, Hiroyuki; Kawakami, Masamichi; Houjiyou, Yuji; Hobo, Yoshihiro; Arimatsu, Youichirou; Tsuji, Yasunori; Hasegawa, Masaaki; and Katou, Seiji, 4,882,630, Cl. 358-451.000.

Tsuji, Yoshitaka, to IDEC IZUMI Corporation. Terminal connector of small electric devices. 4,881,903, Cl. 439-76.000.

Tsujihara, Kenji; Arai, Yoshihisa; Ohtsuki, Osamu; and Nakatani, Tadashi, to Tanabe Seiyaku Co., Ltd. Novel organic platinum complex and process for the preparation thereof. 4,882,447, Cl. 556-40.000.

Tsujita, Mitsuji: *See*—
Kato, Yoshiaki; Tanaka, Masashi; Tsujita, Mitsuji; Kimoto, Keizo; Nishikawa, Hirotsugu; and Kawaguchi, Mika, 4,882,253, Cl. 430-59.000.

Tsunekawa, Shinichi; and Takagi, Masami, to Kabushiki Kaisha Toshiba. Rare gas arc lamp having hot cathode. 4,882,520, Cl. 313-643.000.

Tsuru, Yoshikazu: *See*—
Takita, Masaaki; Tsuru, Yoshikazu; Kitagawa, Toshiharu; and Nomura, Yoshikazu, 4,881,831, Cl. 400-120.000.

Tsuyoshi, Nagata; and Katsuto, Fujita, to Sunstar Engineering Inc. Paint-coating brush. 4,881,289, Cl. 15-168.000.

Tsuzuki, Mitsuo; and Suga, Michihisa, to NEC Corporation. On demand type ink-jet print head having fluid control means. 4,882,596, Cl. 346-140.00R.

Tu, Roger; and Mathewson, Wilfred F., to Baxter International Inc. Heterogeneous elastomeric compositions containing a fluoroelastomer and PTFE and methods for manufacturing said compositions. 4,882,113, Cl. 264-127.000.

Tullman, Robert; and Tullman, Stephen. Variable volume container. 4,881,666, Cl. 222-386.500.

Tullman, Stephen: *See*—
Tullman, Robert; and Tullman, Stephen, 4,881,666, Cl. 222-386.500.

Tullos, Hugh S.: *See*—
Noble, Phillip C.; and Tullos, Hugh S., 4,881,536, Cl. 606-94.000.

Tump, Ronald S., to Moksnes Manufacturing Co., Inc. Loss-in-weight feeder system. 4,882,784, Cl. 364-567.000.

Turbosound Limited: *See*—
Andrews, Anthony J.; and Hunt, Toby C., 4,882,562, Cl. 340-388.000.

Turk, Alan S. Sunshade. 4,881,565, Cl. 135-101.000.

Turnbull, Roy C., to General Motors Corporation. Separable door hinge for vehicle body. 4,881,298, Cl. 16-266.000.

Turner, Anthony P. F.; Hendry, Stuart P.; and Cardosi, Marco F., to Cranfield Institute of Technology. Application of tetrathiafulvalenes in bioelectrochemical processes. 4,882,013, Cl. 204-1.00T.

Turner, Larry G.: *See*—
Mogro-Campero, Antonio; and Turner, Larry G., 4,882,312, Cl. 505-1.000.

Turner, William C. Subassembly for use in manufacturing a tubular product. 4,881,679, Cl. 228-132.000.

Turpin, Marc: *See*—
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Tuy, Heang K.; Krochta, Todd J.; Mailey, Frederick C.; and Lin, Hsayjern, to Picker International, Inc. System to reformat images for three-dimensional display. 4,882,679, Cl. 364-413.220.

Tyrell, John A.; and Wallace, Lawrence R., to General Electric Company. Polyesters with modified melt viscosity. 4,882,375, Cl. 524-161.000.

Uba, Tomohisa: *See*—
Hirata, Tatsushiro; and Uba, Tomohisa, 4,882,516, Cl. 313-407.000.

Ubels, Sibrand A.; and Baxter, Steven L., to Conoco Inc. Method for reducing pressure drop in the transportation of drag reducer. 4,881,566, Cl. 137-13.000.

Uchida, Manabu: *See*—
Yoshida, Naoyuki; Kaneoya, Masakazu; and Uchida, Manabu, 4,882,451, Cl. 556-440.000.

Uchikubo, Akinobu, to Olympus Optical Co., Ltd. Signal processing apparatus for endoscope capable of changing outline enhancement frequency. 4,882,623, Cl. 358-98.000.

Uchimura, Kiyoshi: *See*—
Kageyama, Sadashi; Abe, Yoshio; Yasumoto, Yoshio; Inoue, Shuji; Takai, Hitoshi; Matsumoto, Mitsujiro; Aono, Kouji; Uchimura, Kiyoshi; and Iwasaki, Eiji, 4,882,614, Cl. 358-12.000.

Uchino, Fumio: *See*—
Tateoka, Hitoshi; and Uchino, Fumio, 4,881,618, Cl. 181-176.000.

Uchiyama, Hirao; and Taguchi, Hiromi, to Nissan Motor Co., Ltd. Governor cap sealing structure of transmission gearbox. 4,881,659, Cl. 220-319.000.

Uchiyama, Tetsuya: *See*—
Maeda, Hirokazu; Yamaguchi, Mayumi; Uchiyama, Tetsuya; Baba, Hideki; Matsunami, Hidenobu; Ebihara, Yoshitaka; and Kanegae, Junji, 4,882,192, Cl. 426-607.000.

Udipi, Kishore, to Monsanto Company. Rubber modified reaction molded nylon-6 block copolymers. 4,882,382, Cl. 525-66.000.

Ueda, Toshiaki: *See*—
Yakuyama, Takashi; and Ueda, Toshiaki, 4,882,527, Cl. 318-568.130.

Uehara, Toshihiro; and Watanabe, Rikizo, to Agency of Industrial Science & Technology, Extra-Ministerial Bureau of Ministry of Trade & Industry. Alloys having excellent erosion resistance. 4,882,124, Cl. 420-74.000.

Uekawa, Yutaka; Takata, Shuji; and Goto, Michiyo, to Matsushita Electric Industrial Co., Ltd. Method for extracting formant frequencies. 4,882,758, Cl. 381-50.000.

Ueki, Kazuyoshi: *See*—
Suzuki, Shinji; Arai, Tetsuji; Ueki, Kazuyoshi; Mimura, Yoshiki; and Suzuki, Hiroko, 4,882,263, Cl. 430-328.000.

Uekusa, Tadashi; Koizumi, Takashi; and Amano, Nobuhiko, to Fuji Photo Film Co., Ltd. Simple inspection device for analyzer for ionic activity measurment. 4,882,544, Cl. 324-511.000.

Uematsu, Reppei: *See*—
Nakane, Shinichi; Uno, Takashi; Horii, Hiroshi; Kato, Shinzo; Namba, Mitsuo; and Uematsu, Reppei, 4,881,948, Cl. 48-192.000.

Uetake, Yoshinari: *See*—
Usui, Yasunori; Okamura, Hiroshi; Uetake, Yoshinari; and Fujiwara, Takashi, 4,882,612, Cl. 357-79.000.

Ugai, Yasuhiro: *See*—
Aoki, Shigeo; Miyake, Katsumi; and Ugai, Yasuhiro, 4,881,797, Cl. 350-339.00F.

Uggetti, Sergio: *See*—
Falconieri, Remo; and Uggetti, Sergio, 4,881,837, Cl. 400-625.000.

Uhl, Richard L.; and Uhl, Robert J. Corticotomo osteotome with T-shaped cutting end. 4,881,534, Cl. 606-84.000.

Uhl, Robert J.: *See*—
Uhl, Richard L.; and Uhl, Robert J., 4,881,534, Cl. 606-84.000.

Ulmann, Andreas: *See*—
Moeller, Werner; and Ulmann, Andreas, 4,882,298, Cl. 437-212.000.

Ulmann, Jean-Pierre, to Etablissements Georges KLEIN. Angular anti-return devices associated with turnstiles. 4,881,624, Cl. 188-82.200.

Umezu, Sadao: *See*—
Maeno, Yoshinori; Mikita, Hiroshi; Umezu, Sadao; Matsuda, Fukuhisa; and Ushio, Masao, 4,882,519, Cl. 313-633.000.

Undatim Ultrasonics S.A.: *See*—
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Unibag A/S: *See*—
Olesen, Ejvid H. B., 4,881,825, Cl. 383-906.000.

Union Camp Corporation: *See*—
Wroczynski, Ronald J., 4,882,414, Cl. 528-339.300.

Union Carbide Chemicals and Plastics Company Inc.: *See*—
Cavender, Keith D.; Derderian, Edmond J.; Jarrett, Eugene L.; and Nielsen, Kenneth A., 4,882,107, Cl. 264-51.000.
Ficker, Harold K.; and Sheard, William G., 4,882,380, Cl. 525-53.000.

Union Carbide Corporation: *See*—
Bikson, Benjamin; Miller, James E.; and Nelson, Joyce K., 4,881,954, Cl. 55-16.000.
Bikson, Benjamin; and Giglia, Slavatore, 4,881,955, Cl. 55-16.000.
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Union Oil Company of California: *See*—
Coyle, R. Tom; and Switzer, Jay A., 4,882,014, Cl. 204-1.500.

Uniroyal Goodrich Tire Company, The: *See*—
Rockarts, Rene L.; and Bartley, Donald R., 4,881,881, Cl. 425-28.100.

United Kingdom of Great Britain and Northern Ireland, The Secretary of State of or Defence in Her Britannic Majesty's Government of The: *See*—
Harris, Robert M., 4,882,552, Cl. 332-100.000.

United States of America
America Environmental Protection Agency: *See*—
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Army: *See*—
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Goodman, Henry J.; Walker, Evan H.; and Bell, Emmett L., 4,881,400, Cl. 73-35.000.
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Energy: *See*—
Becker, Frederick E.; and Smolensky, Leo A., 4,881,476, Cl. 110-347.000.
Bench, Thomas R.; and McCann, Larry D., 4,882,071, Cl. 210-747.000.
Olson, A. L.; Batcheller, Tom A.; Rindfleisch, J. A.; and Morgan, John M., 4,881,574, Cl. 137-624.130.
Health and Human Services: *See*—
Driscoll, John S.; Haces, Alberto; and Breitman, Theodore, 4,882,346, Cl. 514-389.000.
Navy: *See*—
Koo, Kee P.; Bucholtz, Frank; and Dandridge, Anthony, 4,881,813, Cl. 356-345.000.
Singer, Paul A., 4,882,551, Cl. 331-78.000.

U.S. Philips Corporation: *See*—
Brown, Kevin J., 4,882,741, Cl. 378-152.000.
Davies, Robert; Hoare, Percy W.; and Gibson, Peter J., 4,882,553, Cl. 333-26.000.
Kamp, Ronald P. T.; and De Meij, Johannes P., 4,881,914, Cl. 445-73.000.
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Petitjean, Gilbert; and Lebourg, Michel, 4,882,504, Cl. 307-256.000.
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United States Surgical Corporation: *See*—
Green, David T.; and Aranyi, Ernest, 4,881,544, Cl. 227-178.000.
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United Technologies Corporation: *See*—
Altman, Michael P., 4,882,735, Cl. 372-86.000.
Rudy, Thomas P.; Goodson, Forrest R.; and Dudley, Mark E., 4,881,994, Cl. 149-109.400.

Unitika Ltd.: *See*—
Imahori, Kazutomo; Kondo, Hitoshi; Nakajima, Hiroshi; and Iwasaki, Tatsuo, 4,882,276, Cl. 435-89.000.

Unitrode Corporation: *See*—
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University College London: *See*—
Shiells, Richard A.; and Falk, Gertrude, 4,882,146, Cl. 424-10.000.

University of California, The Regents of the: *See*—
Eger, Edmond I., II; and Johnson, Brynte H., 4,881,541, Cl. 128-203.250.
Hunt, Anthony C.; and Pidgeon, Charles, 4,882,165, Cl. 424-450.000.

University of Michigan, The Regents of the: *See*—
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University of Michigan-Ann Arbor, The: *See*—
Donahue, Francis M.; Simonsen, Leif R.; and Moy, Russell L., 4,882,244, Cl. 429-194.000.

University of New Mexico, The: *See*—
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University of Sheffield, The: *See*—
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University of Southern California: *See*—
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Uno, Takashi: *See*—
Nakane, Shinichi; Uno, Takashi; Horii, Hiroshi; Kato, Shinzo; Namba, Mitsuo; and Uematsu, Reppei, 4,881,948, Cl. 48-192.000.
UOP: *See*—
Barder, Timothy J., 4,882,065, Cl. 210-674.000.
Cetinkaya, Ismail B., 4,881,592, Cl. 165-104.160.
Kalnes, Tom N.; and James, Robert B., Jr., 4,882,037, Cl. 208-85.000.
Lok, Brent M. T.; Vail, Lawrence D.; and Flanigen, Edith M., 4,882,038, Cl. 208-111.000.
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Urabe, Yosuke: *See*—
Ikada, Yoshito; Gen, Shokyu; Ohi, Shigeo; Urabe, Yosuke; and Kawashima, Hiroyuki, 4,882,162, Cl. 424-444.000.
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Urata, Hiromasa: *See*—
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Urbahn, Friedrich: *See*—
Bartkowiak, Klaus; Graf, Joachim; Urbahn, Friedrich; and Weber, Klaus, 4,881,694, Cl. 242-43.00R.
Urquhart, Andrew W.: *See*—
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USG Interiors, Inc.: *See*—
Bosl, George F.; Kelly, Patrick M.; Alvarez, Dennis A.; Sauer, Gale; and Hocevar, Joseph A., 4,881,355, Cl. 52-738.000.
Ushijima, Takayaki; Igarashi, Katsumasa; and Ishizeki, Seiichi, to Fuji Jukogyo Kabushiki Kaisha. Anti-lock brake control method and system for motor vehicles. 4,881,785, Cl. 303-111.000.
Ushio, Akira; and Sobata, Tomotsu, to Nippon Paint Co., Ltd. Precoated metal plate for heavy forming use. 4,882,215, Cl. 428-143.000.
Ushio, Masao: *See*—
Maeno, Yoshinori; Mikita, Hiroshi; Umezu, Sadao; Matsuda, Fukuhisa; and Ushio, Masao, 4,882,519, Cl. 313-633.000.
Ushio, Yukihide: *See*—
Kimizuka, Junichi; Ushio, Yukihide; Seto, Kaoru; Hori, Kenjiro; and Inuyama, Toshihiko, 4,882,782, Cl. 361-100.000.
Ushioda, Makoto: *See*—
Ohno, Kouji; Saito, Shinichi; Miyazawa, Kazutoshi; Ushioda, Makoto; Inoue, Hiromichi; and Yoshida, Naoyuki, 4,882,084, Cl. 252-299.660.
Usho Denki: *See*—
Suzuki, Shinji; Arai, Tetsuji; Ueki, Kazuyoshi; Mimura, Yoshiki; and Suzuki, Hiroko, 4,882,263, Cl. 430-328.000.
Usui, Yasunori; Okamura, Hiroshi; Uetake, Yoshinari; and Fujiwara, Takashi, to Kabushiki Kaisha Toshiba. Power semiconductor device. 4,882,612, Cl. 357-79.000.
Uzawa, Shunichi; Mori, Tetsuzo; and Koumura, Noboru, to Canon Kabushiki Kaisha. Image information transmitting system. 4,882,776, Cl. 455-617.000.
Uzuda, Tetsuji; Kuramoto, Takashi; Onga, Takeo; Suzuki, Teruo; Koizumi, Masaru; and Kondo, Takeo, to Toppan Printing Co., Ltd. Silhouette cutting apparatus. 4,882,622, Cl. 358-80.000.
Vaahs, Tilo, to Hoechst Aktiengesellschaft. Si,Si'diorganyl-N-alkyl-tetrachloro-disilazanes and a process for their preparation. 4,882,448, Cl. 556-412.000.
Vail, Lawrence D.: *See*—
Lok, Brent M. T.; Vail, Lawrence D.; and Flanigen, Edith M., 4,882,038, Cl. 208-111.000.
Vail, William B., III, to ParaMagnetic Logging, Inc. Methods and apparatus for measurement of electronic properties of geological formations through borehole casing. 4,882,542, Cl. 324-368.000.
Vale, Michael. Combination lock. 4,881,390, Cl. 70-219.000.
Valenduc, Gerard, to Eurofloor S.A. Process and apparatus for the manufacture of floor or wall coverings incorporating pebbles, and the product obtained therefrom. 4,882,205, Cl. 427-204.000.
Valeo: *See*—
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Valeri, Stephen J.: *See*—
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Valmet Paper Machinery Inc.: *See*—
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Valyocsik, Ernest W.: *See*—
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Van Alstine, Terrance L., to Nabisco Brands, Inc. System for processing chewing gum. 4,882,172, Cl. 425-113.000.
VanCucha, James M., to Cleveland Container Corporation. Sealed container. 4,881,658, Cl. 220-306.000.
Van De Kop, Andrew R.; and Van De Kop, Franz. Method and apparatus for rating billiard shots and displaying optimal paths. 4,882,676, Cl. 364-410.000.
Van De Kop, Franz: *See*—
Van De Kop, Andrew R.; and Van De Kop, Franz, 4,882,676, Cl. 364-410.000.
Van de Moere, Alan V., to Eastman Kodak Company. Underwater disposable single-use camera. 4,882,600, Cl. 354-64.000.
Van den Berg, Albert: *See*—
Sudholter, Ernst J.; Skowronska-Ptasinska, Maria D.; Van der Wal, Peter D.; Van den Berg, Albert; and Reinhoudt, David N., 4,882,292, Cl. 437-42.000.
Van Den Elst, Fredrik M. N.; and Bakker, Jan, to Texas Instruments Incorporated. Heating device for fluid, particularly fuel. 4,881,508, Cl. 123-549.000.
van der Lely, Cornelis. Voice activated compact electronic calculator. 4,882,685, Cl. 364-709.110.
Van der Wal, Peter D.: *See*—
Sudholter, Ernst J.; Skowronska-Ptasinska, Maria D.; Van der Wal, Peter D.; Van den Berg, Albert; and Reinhoudt, David N., 4,882,292, Cl. 437-42.000.
Van Diemen, Paul: *See*—
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Vanes, Stephen E.: *See*—
Smith, John D.; and Vanes, Stephen E., 4,881,983, Cl. 148-16.600.
van Gils, Willibrordus J., to U.S. Philips Corporation. Data processing device composed of four data processing modules of substantially identical construction, with protection both against simultaneous single-bit failures in a plurality of data processing modules and against failure of a single data processin. 4,882,731, Cl. 371-37.600.
Van Horssen, Charles A. Hand held swimming pool tile descaler. 4,881,978, Cl. 134-16.000.
Van Ommeren, James: *See*—
Mattiola, Paul A.; and Van Ommeren, James, 4,881,374, Cl. 62-50.600.
Mattiola, Paul A.; and VanOmmeren, James, 4,881,375, Cl. 62-50.600.
Vanoni, Carlo, to Mida S.r.l. Portable electrical labelling machine. 4,881,462, Cl. 101-292.000.
Van Rosmalen, Gerard E., to U.S. Philips Corporation. Device for optically scanning a rotating disc. 4,882,723, Cl. 369-256.000.
van't Hooft, Eric; and van Zwol, Libbe, to van't Hooft, Eric. Method of treating a part of the body with radioactive material and a trolley for use therein. 4,881,937, Cl. 600-3.000.
van't Hooft, Eric. Method and an apparatus for treating a part of the body with radioactive material. 4,881,938, Cl. 600-3.000.
van Zwol, Libbe: *See*—
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Varian Associates, Inc.: *See*—
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Varley, George J., III. Apparatus for dispensing strip material from a roll. 4,881,675, Cl. 225-43.000.
Vaughn, Bennie J.: *See*—
Durant, Douglas M.; Kugler, Uwe H.; Vaughn, Bennie J.; Nordquist, Douglas W.; and Delfs, Larry M., 4,881,573, Cl. 137-614.040.
Veit GmbH & Co.: *See*—
Hafner, Josef; Bergmeier, Werner; Schonenberger, Rolf; and Fischer, Matthias, 4,881,468, Cl. 104-103.000.
Vela, Leo; Sasser, Thurman; and Martin, Roger L. Shoppers communication system and processes relating thereto. 4,882,724, Cl. 364-401.000.
Velcro Industries. B.V.: *See*—
Hatch, Richard N., 4,881,997, Cl. 156-66.000.
Ventouras, Kimon, to Zyma Sa. Swellable pellets. 4,882,169, Cl. 424-493.000.
Verboom, Johannes J.: *See*—
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Veronesi, Sergio: *See*—
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Verrando, Marcel G., III, to Pall Corporation. Capacitance probe for use in absorbent systems. 4,882,648, Cl. 361-286.000.
Verstrate, Gary W.: *See*—
Cozewith, Charles; Ju, Shiaw; and Verstrate, Gary W., 4,882,406, Cl. 526-336.000.
Vettor, Antonio; Passarini, Nello; and Marcotullio, Armando, to Enitricerche S.p.A. Process for the beneficiation of coal by selective caking. 4,881,946, Cl. 44-627.000.
Vigilia, Larry P. Device and method for assisting in artificial respiration. 4,881,540, Cl. 128-202.280.
Viirto, Jarmo: *See*—
Luukkala, Mauri; Matilainen, Aarre; and Viirto, Jarmo, 4,882,499, Cl. 250-577.000.
Villa, Ezio; and Biazzi, Giuseppe, to Alfa Lancia Industriale S.p.A. Movable cover device for an automobile lock. 4,881,391, Cl. 70-455.000.
Visuron, Inc., a Mich. Corp.: *See*—
Davis, Thomas E., 4,881,348, Cl. 52-127.700.
Vital Kogyo Kabushiki Kaisha: *See*—
Nishimura, Yosaku, 4,881,720, Cl. 254-358.000.
Vlodavsky, Israel; Eldor, Amiram; Naparstek, Yaakov; and Cohen, Irun R., to Hadassa Medical Organization; and Yeda Research and Development Company Limited. Method for decreasing tumor metastasis. 4,882,318, Cl. 514-56.000.

Vodopia, Samuel N., to Hughes Aircraft Company. Electronically roll stabilized and reconfigurable active array system. 4,882,587, Cl. 342-372.000.

Volk, Joseph A., Jr., to Beta Raven Inc. Method of automatically controlling an extruder. 4,882,105, Cl. 264-40.100.

Volk, Karl G.; and Delisle, William J., to Semprex Corporation. Tool offset indicator. 4,881,858, Cl. 409-218.000.

Vollaro, Joseph F., to Perkin-Elmer Corporation, The. Full format variable width film hold-down device. 4,881,711, Cl. 248-362.000.

Volpe, Joseph J.: *See—*
Fuchs, Charles R.; Haessig, David A., Jr.; Heckathorn, David L.; Kass, Jordan S.; Lindsay, Peter; and Volpe, Joseph J., 4,881,800, Cl. 350-500.000.

von Daehne, Welf: *See—*
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von der Heide, Johann, to Papst-Motoren GmbH & Co. KG. Brushless three-phase D.C. motor. 4,882,511, Cl. 310-67.00R.

von der Saal, Wolfgang; Holck, Jens-Peter; Mertens, Alfred; Muller-Beckmann, Bernd; and Kling, Lothar, to Boehringer Mannheim GmbH. 5-alkylbenzimidazoles, method of use and pharmaceutical compositions. 4,882,342, Cl. 514-338.000.

Von Holdt, John W. Safety lift lock with internal member. 4,881,715, Cl. 249-165.000.

Voss, George F.: *See—*
Thompson, Noel E.; Johns, Richard Martin; Rozmus, Gregory; Voss, George F.; Edwards, William J.; and Thomas, Peter J., 4,881,392, Cl. 72-7.000.

Vriens, Leendert, to U.S. Philips Corporation. Projection device and associated electro-optic monochrome display device with phosphor layer and interference filters. 4,882,617, Cl. 358-60.000.

Vuagnat, Eric. Steering device for motor vehicle. 4,881,755, Cl. 280-779.000.

Vuorinen, Vesa: *See—*
Eskelinen, Pekka; Vuorinen, Vesa; and Rantanen, Seppo, 4,882,011, Cl. 162-368.000.

W. R. Grace & Co.: *See—*
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W. R. Grace & Co.-Conn.: *See—*
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Morgan, Charles R.; Chen, Cheng-Chi; Blinka, Thomas A.; and Obligin, Alan S., 4,882,057, Cl. 210-500.230.

Wabash National Corporation: *See—*
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Wackrow, Roger D.; and Jones, Harold C., to BSA Guns (UK) Limited. Air guns. 4,881,517, Cl. 124-65.000.

Wadell Equipment Company, Inc.: *See—*
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Wagner, Robert E.: *See—*
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Wagner, Rudolf: *See—*
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Wagner Spray Tech Corporation: *See—*
McMillen, Ronald R.; and Anderley, John J., 4,882,116, Cl. 264-254.000.

Waite, Ian, to Biocycle Pty. Ltd. Multi-chamber septic tank assembly. 4,882,046, Cl. 210-195.300.

Wakiyama, Yoshihiro; Aoyama, Takeshi; and Ohnishi, Yoshiro, to Horiba, Ltd. Method of correcting a dead time. 4,882,503, Cl. 307-267.000.

Wakui, Tetsuya, to Canon Kabushiki Kaisha. Recording and reproducing apparatus using recorded numeral information signals for program detection. 4,882,640, Cl. 360-73.050.

Waldhauer, Fred D., to Resound Corporation. Low voltage programmable compressor. 4,882,761, Cl. 381-106.000.

Waldhauer, Fred D., to Resound Corporation. Multi-band programmable compression system. 4,882,762, Cl. 381-106.000.

Walker, Evan H.: *See—*
Goodman, Henry J.; Walker, Evan H.; and Bell, Emmett L., 4,881,400, Cl. 73-35.000.

Wallace, Lawrence R.: *See—*
Tyrell, John A.; and Wallace, Lawrence R., 4,882,375, Cl. 524-161.000.

Walsh, David A.; and Yanni, John M., to A. H. Robins Company, Incorporated. 1-aryloxy-4-[((4-aryl)-1-piperazinyl]-2-butanols useful as antiallergy agents. 4,882,330, Cl. 514-255.000.

Walter, Herbert, to Protoned B.V. Shelf for displaying articles. 4,881,708, Cl. 248-243.000.

Walter Odemer Co., Inc.: *See—*
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Odemer, Walter, 4,881,910, Cl. 439-476.000.

Wang Laboratories, Inc.: *See—*
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Wang, Oliver, to Casual Living International Inc. Chairs with foldable backs. 4,881,776, Cl. 297-379.000.

Wang, Richard H. S.; and Myers, Garry L., to Eastman Kodak Company. Dioxaphosphorinane compounds and polyolefin compositions sabilized therewith. 4,882,374, Cl. 524-117.000.

Ward, Seth, II, to POM Incorporated. Breakover handle for parking meter. 4,881,631, Cl. 194-228.000.

Wardell, Harry H., to Dellchem, Inc. Waste water clarification. 4,882,070, Cl. 210-727.000.

Wardlaw, Norman C.: *See—*
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Wardwell, Kathleen: *See—*
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Warner-Lambert Company: *See—*
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Scheurer, Heinrich P.; and McNamee, Adrian G., 4,882,161, Cl. 424-441.000.
Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,151, Cl. 424-440.000.
Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,153, Cl. 424-440.000.
Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,154, Cl. 424-440.000.
Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,155, Cl. 424-440.000.
Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,156, Cl. 424-440.000.
Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,158, Cl. 424-440.000.
Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,159, Cl. 424-440.000.
Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,882,160, Cl. 424-440.000.

Warner, Steven B., to Kimberly-Clark Corporation. Multilayer polymeric film having dead bend characteristics. 4,882,230, Cl. 428-516.000.

Warren, James B.: *See—*
Edwards, Stanley H., Jr.; Smith, Simon S., Jr.; and Warren, James B., 4,882,459, Cl. 200-83.00J.

Warren, Tommy M.; Winters, Warren J.; and Brett, Jame F., to Amoco Corporation. Stabilizing and drilling apparatus and method. 4,881,605, Cl. 175-320.000.

Wasley, Jan W. F., to Ciba-Geigy Corporation. 4-Amino-substituted 1,2-dihydroxynaphthalene derivatives useful in inhibiting 5-lipoxygenase activity in mammals. 4,882,339, Cl. 514-319.000.

Wasserman, Kurt. Water distiller. 4,882,012, Cl. 202-176.000.

Watanabe, Izumi: *See—*
Tashahashi, Minoru; Tokuda, Hirosstu; Watanabe, Izumi; and Nishimura, Yutaka, 4,881,407, Cl. 73-204.160.

Watanabe, Kazuo: *See—*
Takamura, Yoshinobu; Katsumura, Norimichi; Osawa, Nebuhiko; and Watanabe, Kazuo, 4,882,546, Cl. 329-310.000.

Watanabe, Makoto: *See—*
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Watanabe, Rikizo: *See—*
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Watanabe, Satoshi: *See—*
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Watanabe, Yasuo: *See—*
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Watari, Haruhiko: *See—*
Takahashi, Atsushi; and Watari, Haruhiko, 4,881,764, Cl. 292-13.000.

Watari, Masao, to NEC Corporation. Pattern matching system using dynamic programming. 4,882,756, Cl. 381-42.000.

Watership PTY. Ltd.: *See—*
Gaissmaier, Rudi, 4,881,307, Cl. 29-6.100.

Watson, Douglas M. Compact tabletop machine for making labels and other laminations. 4,882,004, Cl. 156-381.000.

Waxman, Burton H.: *See—*
Kojima, Yasuhiko; Pilot, John; and Waxman, Burton H., 4,882,261, Cl. 430-264.000.

Weaver, Charles S.; Chittenden, Constance T.; and Conner, Allen B., Jr., to Digideck, Inc.; and Digital Recording Research Limited Partnership. Data compression system and method with buffer control. 4,882,754, Cl. 381-35.000.

Weaver, Mark L., to Aluminum Company of America. Method and apparatus for making light metal-alkali metal master alloy using alkali metal-containing scrap. 4,882,017, Cl. 204-71.000.

Weaver, Max A.; Coates, Clarence A., Jr.; Pruett, Wayne P.; and Hilbert, Samuel D., to Eastman Kodak Company. Polyester polymer containing the residue of the UV absorbing benzopyran compound and shaped articles produced therefrom. 4,882,412, Cl. 528-190.000.

Weber, Georg: *See—*
Eidenschink, Rudolf; Krause, Joachim; Hittich, Reinhard; Poetsch, Eike; Scheuble, Bernhard; Weber, Georg; and Pohl, Ludwig, 4,882,082, Cl. 252-299.610.

Weber, James J.: *See—*
Kramer, Daniel P.; Santangelo, Joseph G.; and Weber, James J., 4,882,110, Cl. 264-63.000.

Weber, Jean-Pierre. Isothermal package material. 4,881,646, Cl. 206-460.000.

Weber, Klaus: *See—*
Bartkowiak, Klaus; Graf, Joachim; Urbahn, Friedrich; and Weber, Klaus, 4,881,694, Cl. 242-43.00R.

Weber, Ralph G.; and Wells, William, to Kortec AG. Process for feeding heat energy into a molten metal bath. 4,881,972, Cl. 75-93.00G.

Webster, Charles A.; and John, Christian J., to American National Can Company. Apparatus for making tamper-evident closures. 4,881,892, Cl. 425-577.000.

Wech, Robert J., to Amplas, Inc. Draw tape bag forming method and apparatus. 4,881,933, Cl. 493-225.000.

Weetman, Ronald J., to General Signal Corporation. Mass transfer mixing system especially for gas dispersion in liquids or liquid suspensions. 4,882,098, Cl. 261-93.000.

Weihrauch, Georg: *See*—
Hollenberg, Detlef; Schneider, Hans; and Weihrauch, Georg, 4,881,558, Cl. 132-112.000.

Weimann, Norbert; Dahm, Manfred; Nehen, Ulrich; and Schafer, Walter, to Bayer Aktiengesellschaft. Foamed microbeads and a process for their preparation. 4,882,362, Cl. 521-54.000.

Weiss, Gerhard: *See*—
Franzen, Jochen; Gabling, Reemt-Holger; Heinen, Gerhard; and Weiss, Gerhard, 4,882,484, Cl. 250-282.000.

Welles, Toby S.: *See*—
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Wells, William: *See*—
Weber, Ralph G.; and Wells, William, 4,881,972, Cl. 75-93.00G.

Wen, Betty P. L.: *See*—
Wright, Arthur P. G.; Wen, Betty P. L.; Schenck, Terry G.; and Maron, Antonina, 4,882,324, Cl. 514-191.000.

Wendman, Mark, to Motorola, Inc. Method and system for producing thin films. 4,882,023, Cl. 204-192.310.

Wenz, Robert P.: *See*—
Grimmer, Derrick P.; and Wenz, Robert P., 4,882,239, Cl. 429-7.000.

Werner, Thomas: *See*—
Lohrmann, Gerhard; Engelhardt, Guenter; and Werner, Thomas, 4,881,838, Cl. 400-662.000.

West, Alden D.: *See*—
Laganis, Evan D.; and West, Alden D., 4,882,265, Cl. 430-522.000.

West, Calvin W.: *See*—
Brynsvold, Glen V.; Lopez, John T.; Olich, Eugene E.; and West, Calvin W., 4,882,514, Cl. 310-208.000.

West Company, The: *See*—
Romberg, Val G.; Kiang, Patty H.; Curry, Wayne T.; and Pfister, Ralph E., 4,882,210, Cl. 428-34.700.

Westerman Jr., Everett A., to Boeing Company, The. In-situ surface treatment containment apparatus and method. 4,882,016, Cl. 204-15.000.

Westinghouse Electric Corp.: *See*—
Roarty, David H., 4,881,409, Cl. 73-597.000.

Westphalen, Karl-Otto: *See*—
Saupe, Thomas; Klebe, Gerhard; Schirmer, Ulrich; Paul, Gerhard; Kober, Reiner; Wuerzer, Bruno; Berghaus, Rainer; Meyer, Norbert; and Westphalen, Karl-Otto, 4,881,969, Cl. 71-94.000.

Weyer, Paul P. Fluid-power bearing actuator. 4,881,419, Cl. 74-89.150.

Weyerhaeuser Company: *See*—
Gaddis, Paul G.; and Perdelwitz, Lee E., Jr., 4,882,213, Cl. 428-136.000.
Wislocker, Frank; and Blickenderfer, Charles, 4,881,584, Cl. 144-39.000.

Whetsel, James E.: *See*—
Amos, Michael D.; Brosnan, Denis A.; Samas, Mark V.; Singer, Richard E.; Whetsel, James E.; and Kovarik, David P., 4,881,677, Cl. 228-33.000.

Whirlpool Corporation: *See*—
Blackman, Gordon R., 4,881,909, Cl. 439-191.000.

White, Alan W., to Eastman Kodak Company. Novel diethanolamine triactic acid triamides and methods for improving feed utilization and lactation in ruminant animals. 4,882,355, Cl. 514-616.000.

White, Billy P.; and Morrison, Dwayne E., to Bell Helicopter Textron Inc. Tail rotor. 4,881,874, Cl. 416-138.000.

White, Danny R.: *See*—
Kennedy, Christopher R.; Urquhart, Andrew W.; White, Danny R.; and Newkirk, Marc S., 4,882,306, Cl. 501-87.000.

White, Jonathan R., to Norand Corporation. Bar code reader with enhanced sensitivity. 4,882,476, Cl. 235-462.000.

White, Jonathan R.: *See*—
Miller, Phillip; Shindley, Richard P.; Feltz, Kristi T.; Hanson, George E.; and White, Jonathan R., 4,882,475, Cl. 235-383.000.

White, Robert D.: *See*—
Maxwell, Ray F.; and White, Robert D., 4,882,765, Cl. 455-18.000.

Whitmer, Joseph W.: *See*—
Stazo, Jack; and Whitmer, Joseph W., 4,881,654, Cl. 220-85.00H.

Whyman, Peter J. M.: *See*—
Dobson, Brian; Whyman, Peter J. M.; Doy, Ralph J.; Engel, Manfred O.; and Davies, Raymond, 4,882,444, Cl. 549-534.000.

Wicklund, Joseph B.: *See*—
Mauritz, Karl H.; Leger, Geary L.; Wicklund, Joseph B.; Herrud, James E.; and Laney, Steven H., 4,882,700, Cl. 365-51.000.

Widell, Harald: *See*—
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Widell, Jan: *See*—
Bergman, Nils-Åke; Widell, Harald; and Widell, Jan, 4,881,907, Cl. 439-111.000.

Wiggins Teape Group Limited, The: *See*—
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Wilds, Jack C.: *See*—
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Wilkie, Arnold E.: *See*—
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Wm. Wrigley Jr. Company: *See*—
Ream, Ronald L.; Riedy, Robert D.; and McHale, Michael, 4,882,175, Cl. 426-5.000.

Williams, James E., to Du Pont de Nemours, E. I., and Company. Life silver recovery system. 4,881,973, Cl. 75-118.00P.

Williams, Jerry. Infrared communication apparatus for remote site applications. 4,882,747, Cl. 379-102.000.

Williams, Richard C. Cervical fusion retractor. 4,881,525, Cl. 128-20.000.

Williams, Stephen J.; and Traster, Elden D., to Aristacom International, Inc. Adaptive digital network interface. 4,882,727, Cl. 370-79.000.

Willis, Anthony J.: *See*—
Radvan, Bronislaw; and Willis, Anthony J., 4,882,114, Cl. 264-129.000.

Willis, Carl L.; and Chin, Steven S., to Shell Oil Company. Modified block copolymers. 4,882,384, Cl. 525-105.000.

Willis, Donald H.: *See*—
Fling, Russell T.; and Willis, Donald H., 4,882,626, Cl. 358-166.000.

Willis, William M. Remote indicating dip stick. 4,881,486, Cl. 116-227.000.

Wilson Antenna Inc.: *See*—
Galvin, Richard W.; and Wilson, James W., 4,882,591, Cl. 343-715.000.

Wilson, David A.: *See*—
Simon, Jaime; Garlich, Joseph R.; Wilson, David A.; and McMillan, Kenneth, 4,882,142, Cl. 424-1.220.

Wilson, James W.: *See*—
Galvin, Richard W.; and Wilson, James W., 4,882,591, Cl. 343-715.000.

Wilson Sporting Goods Co.: *See*—
Crowley, Kevin J., 4,881,329, Cl. 36-38.000.

Wilwerding, Dennis J., to Honeywell Inc. Self-aligning aperture. 4,882,262, Cl. 430-321.000.

Wimmer, R. Peyton: *See*—
Giles, Conley W.; Teare, Karen L.; and Wimmer, R. Peyton, 4,881,803, Cl. 351-156.000.

Windmere Corporation: *See*—
Kin, Lai, 4,881,559, Cl. 132-226.000.

Wing, George S. Process for setting a threaded torque-limited collar and pin joint. 4,881,316, Cl. 29-510.000.

Winkley, Michael W.; and Diebold, James L., to American Home Products. 1,2,3,4,5,6-hexahydro[1,3,6]triazocino[1,1-a]benzimidazoles. 4,882,323, Cl. 514-183.000.

Winters, Warren J.: *See*—
Warren, Tommy M.; Winters, Warren J.; and Brett, Jame F., 4,881,605, Cl. 175-320.000.

Wirkus, Clarence. Method of and apparatus for fishing with a backwards hook. 4,881,339, Cl. 43-42.040.

Wisconsin Milk Marketing Board: *See*—
Beyer, James D.; and Johnson, Mark E., 4,882,179, Cl. 426-36.000.

Wise, Kensall D.; and Chau, Hin-Leung, to University of Michigan, The Regents of the. Ultraminiature pressure sensor and method of making same. 4,881,410, Cl. 73-724.000.

Wise, Thomas B. Preformed pattern for producing occlusal splints. 4,881,713, Cl. 249-54.000.

Wislocker, Frank; and Blickenderfer, Charles, to Weyerhaeuser Company. Infeed conveyor for saw. 4,881,584, Cl. 144-39.000.

Witmer, Warner H., to CVD Systems & Services. Heating element. 4,882,203, Cl. 427-124.000.

Witt, David B., to Advanced Micro Devices, Inc. Method and apparatus for testing an integrated circuit including a microprocessor and an instruction cache. 4,882,673, Cl. 364-200.000.

Wittenberg, Daniel: *See*—
Sandwith, Stanley R.; and Wittenberg, Daniel, 4,881,482, Cl. 114-256.000.

Wittmann, Dieter; Kress, Hans-Jurgen; Bottenbruch, Ludwig; Leitz, Edgar; and Peters, Horst, to Bayer Aktiengesellschaft. Moulding compounds of aromatic polyesters and grafted silicone rubber. 4,882,381, Cl. 525-63.000.

Wittry, David B., to University of Southern California. Scanning monochromator crystal and related method. 4,882,780, Cl. 378-84.000.

Wohrstein, Franz X.: *See*—
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Woltjes, Dieter: *See*—
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Wong, John M.; and Lowe, Thomas J., to General Environmental Science. Solubilization of organic materials in wastewater treatment. 4,882,059, Cl. 210-606.000.

Wong, Mon N., to Hughes Aircraft Company. Plural plane waveguide coupler. 4,882,555, Cl. 333-116.000.

Woo, James T. K.; and Marcinko, Richard M., to Glidden Company, The. Water-dispersed epoxy/acrylic coatings for plastic substrates. 4,882,372, Cl. 523-411.000.

Wood, J. B. Boat anchor. 4,881,483, Cl. 114-294.000.

Wood, William P.: *See*—
Monroe, Larry D.; and Wood, William P., 4,881,951, Cl. 51-309.000.

Wottlin, James E. Motor incorporating a superconducting shield. 4,882,509, Cl. 310-46.000.

Wright, Arthur P. G.; Wen, Betty P. L.; Schenck, Terry G.; and Maron, Antonina. Essentially pure acid hydroxyl ligand aluminum complexes and their preparation. 4,882,324, Cl. 514-191.000.

Wright, Diana R.; and Schlerf, David W., to Pioneering Technologies, Inc. Heart valve and xenograft washing system. 4,881,562, Cl. 134-110.000.

Wright, Everaid V.; and Manley, Thomas L., Jr., to Davy McKee Corporation. Method of forming an immersed dam foundation and a dam structure thereon. 4,881,848, Cl. 405-116.000.

Wroczynski, Ronald J., to Union Camp Corporation. Polyamide from polymeric fatty acid and long chain dicarboxylic acid. 4,882,414, Cl. 528-339.300.

Wu, Chyuang-Jong. Anti-earthquake structure insulating the kinetic energy of earthquake from buildings. 4,881,350, Cl. 52-167.00R.

Wuerzer, Bruno: *See*—
Saupe, Thomas; Klebe, Gerhard; Schirmer, Ulrich; Paul, Gerhard; Kober, Reiner; Wuerzer, Bruno; Berghaus, Rainer; Meyer, Norbert; and Westphalen, Karl-Otto, 4,881,969, Cl. 71-94.000.

Wulf, Hans C., to Chromo-Light ApS. Method and an apparatus for determining an individual's ability to stand exposure to ultraviolet radiation. 4,882,598, Cl. 250-338.100.

Wunderlich, Erhard, to Speck-Pumpenfabrik, Walter Speck KG. Peripheral pump. 4,881,871, Cl. 415-119.000.

Wykes, Philip; and Pariseau, David L., to Morgan Construction Company. Overhung roll assembly. 4,881,310, Cl. 29-122.000.

Wyland, David C., to Integrated Device Technology, Inc. Conditional write RAM. 4,882,709, Cl. 365-189.020.

Wyrick, Charles A.: *See*—
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Xerox Corporation: *See*—
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Loutfy, Rafik O.; Hor, Ah-Mee; Liebermann, George; Toth, Alan J; Hsiao, Cheng-Kuo; Carmichael, Kathleen M.; and Tokoli, Emery G., 4,882,254, Cl. 430-59.000.
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Yaegashi, Hisao: *See*—
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Yagi, Hiroshi; Fujita, Hisashi; Harada, Yoshio; and Takahashi, Kenichi, to TDK Corporation. Process for mounting chip type circuit elements on printed circuit boards and apparatus therefor. 4,881,319, Cl. 29-840.000.

Yagisita, Sigelu: *See*—
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Yahiro, Kenji, to NEC Corporation. System for initialization of channel controllers utilizing address pointers calculated from multiplying sizes of data fields with device numbers. 4,882,672, Cl. 364-200.000.

Yakuyama, Takashi; and Ueda, Toshiaki, to Nissan Motor Co., Ltd.; and Tokyo Boeki Ltd. Three-dimensional measuring robot. 4,882,527, Cl. 318-568.130.

Yale Security Inc.: *See*—
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Yamada, Hideto: *See*—
Yoshioka, Shigehiko; Yamada, Hideto; Sato, Hisatake; and Kamei, Motokazu, 4,882,087, Cl. 252-312.00'.

Yamada, Jun; and Eguchi, Hiromi, to Mitsubishi Paper Mills, Ltd. Electrophotographic plate for making printing plate comprising phthalocyanine pigment and thiobarbituric acid residue containing compound. 4,882,248, Cl. 430-49.000.

Yamada, Shinichi: *See*—
Kabune, Hideki; Kamiya, Kohji; Miyake, Kiyoshi; Saito, Shigeru; Yamada, Shinichi; and Asami, Ken, 4,882,530, Cl. 318-696.000.

Yamada, Tomio: *See*—
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Yamada, Yasuhiro: *See*—
Matsuoka, Mikiharu; Yamada, Yasuhiro; Miyazaki, Yasuko; Kanemoto, Takashi; Katayama, Hirohiko; and Ikuta, Tamao, 4,881,900, Cl. 434-113.000.

Yamada, Youichi; and Takahashi, Keiko, to Oki Electric Industry Co., Ltd. Speech recognition system which avoids ambiguity when matching frequency spectra by employing an additional verbal feature. 4,882,755, Cl. 381-41.000.

Yamaguchi, Akira: *See*—
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Yamaguchi, Hideya; Hayasaki, Hiroyuki; Kawakami, Masamichi; Houjiyou, Yuji; Hobo, Yoshihiro; Arimatsu, Youichirou; Tsuji, Yasunori; Hasegawa, Masaaki; and Katou, Seiji, to Sanyo Electric Co., Ltd. Printing apparatus and facsimile equipment. 4,882,630, Cl. 358-451.000.

Yamaguchi, Kouji: *See*—
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Yamaguchi, Mayumi: *See*—
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Yamaguchi, Shigeki; Ohiwa, Norio; and Ishiguro, Katsusuke, to Paloma Kogyo Kabushiki Kaisha. Pulse combustion device. 4,881,373, Cl. 60-732.000.

Yamaguchi, Tetsuro: *See*—
Hoshi, Norio; Yamaguchi, Tetsuro; Okada, Yasuhiro; and Matsukawa, Takao, 4,881,614, Cl. 180-225.000.

Yamaguchi, Toshio, to Nissan Motor Co., Ltd. Automatic transmission having coaxially overlapped clutches. 4,881,628, Cl. 192-85.0AA.

Yamaguchi, Yoshiki: *See*—
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Yamaha Corporation: *See*—
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Yamahira, Katsutoshi: *See*—
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Yamaichi Electric Mfg. Co., Ltd.: *See*—
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Yamamoto, Koji: *See*—
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Yamamoto, Kunio: *See*—
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Yamamoto, Makoto: *See*—
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Yamamoto, Susumu; Kakuta, Takuya; Sato, Toshiaki; Morimoto, Katsushi; Oya, Eiichi; Ikai, Takashi; and Nawamaki, Tsutomu, to Nissan Chemical Industries, Ltd. Wheat growing process utilizing selective herebicide. 4,881,965, Cl. 71-92.000.

Yamamoto, Toshiro: *See*—
Marugama, Kazuo; Horie, Kiyoshi; Noami, Tsuneo; Yamamoto, Toshiro; Adachi, Koji; Okamoto, Toru; Sumikawa, Takeshi; and Nobumasa, Furuya, 4,882,247, Cl. 430-45.000.

Yamaoka, Masao; and Toyota, Tomohiro, to Kabushiki Kaisha Daiki Aluminium Kogyosho. Automatic melt supplying method and holding furnace having automatic melt supplying system. 4,881,670, Cl. 222-590.000.

Yamashita, Yoshisato: *See*—
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Yamato, Osamu; and Takino, Tetsuji, to Oki Electric Industry Co., Ltd. Dielectric block plating apparatus. 4,882,026, Cl. 204-275.000.

Yamato, Yoshihisa: *See*—
Ono, Akira; Fuse, Toshikazu; Miyamoto, Osamu; Makino, Shoso; Yamato, Yoshihisa; Kametani, Hiroshi; Tokura, Susumu; Tanaka, Hiromi; Ito, Toru; Nakao, Hitomi; Tokuoka, Shuji; and Takeda, Toshihide, 4,882,220, Cl. 428-240.000.

Yamauchi, Hidetoshi: *See*—
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Yamauchi, Kiyotaka: *See*—
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Yamauchi, Takashi: *See*—
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Yamazaki, Kazuya: *See*—
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Yanase, Sumio: *See*—
Setaka, Yousuke; Yanase, Sumio; Takeuchi, Kanji; and Miyahara, Masahiko, 4,881,414, Cl. 73-862.330.

Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., to Warner Lambert Co. Confectionery delivery system for antihistimines. 4,882,151, Cl. 424-440.000.

Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J. Confectionery delivery system for laxatives, vitamins and antacids. 4,882,152, Cl. 424-440.000.

Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., to Warner Lambert Co. Confectionery delivery system for antitussives. 4,882,153, Cl. 424-440.000.

Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., to Warner Lambert Co. Confectionery delivery system for mineral supplements. 4,882,154, Cl. 424-440.000.

Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., to Warner Lambert Co. Confectionery delivery system for antiarrhythmics. 4,882,155, Cl. 424-440.000.

Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., to Warner Lambert Co. Confectionery delivery system for expectorants. 4,882,156, Cl. 424-440.000.

Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J. Confectionery delivery system for anti-cholesterolemics. 4,882,157, Cl. 424-440.000.

Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., to Warner Lambert Co. Confectionery delivery system for decongestants. 4,882,158, Cl. 424-440.000.

Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., to Warner Lambert Co. Confectionery delivery system for appetite suppressants. 4,882,159, Cl. 424-440.000.
Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., to Warner Lambert Co. Confectionery delivery system for dictary fiber. 4,882,160, Cl. 424-440.000.
Yang, Woo S.: *See*—
Suzuki, Katsumi; and Yang, Woo S., 4,881,917, Cl. 446-468.000.
Yanni, John M.: *See*—
Walsh, David A.; and Yanni, John M., 4,882,330, Cl. 514-255.000.
Yano, Kazuhiko; Sakikawa, Shigenori; and Okanishi, Toshiaki, to Kanzaki Kokyukoki Mfg. Co. Ltd. Steering apparatus for a vehicle. 4,881,612, Cl. 180-132.000.
Yanusko, David P.; and Geiger, Robert, Jr., to Teleflex Incorporated. Round-orienting replenisher for ammunition storage and transport system. 4,881,447, Cl. 89-34.000.
Yaoka, Osamu: *See*—
Murakami, Shu; Ikebe, Tsuguo; Hakamada, Ichiro; and Yaoka, Osamu, 4,882,326, Cl. 514-211.000.
Yardley, John P.: *See*—
Abou-Gharbia, Magid A.; Yardley, John P.; and Childers, Wayne E., Jr., 4,882,432, Cl. 544-295.000.
Yasuda, Eturo: *See*—
Tomita, Masahiro; and Yasuda, Eturo, 4,882,079, Cl. 252-62.900.
Yasuda, Tomio; Aoki, Kohji; and Mori, Kazuo, to Aisin Seiki Kabushikikaisha. Onboard air discharge system. 4,881,456, Cl. 98-2.010.
Yasue, Kazuo, to NEC Corporation. Data transmission system including the downloading of a first program for the interruption of a second program. 4,882,705, Cl. 364-900.000.
Yasufuki, Shoji: *See*—
Kise, Masahiro; Ozaki, Masakuni; Kazuno, Kenji; Tomii, Yoshifumi; Segawa, Jun; and Yasufuki, Shoji, 4,882,328, Cl. 514-236.200.
Yasumoto, Takaaki: *See*—
Furukawa, Osamu; Harata, Mitsuo; Yasumoto, Takaaki; and Imai, Motomasa, 4,882,652, Cl. 361-321.000.
Yasumoto, Yoshio: *See*—
Kageyama, Sadashi; Abe, Yoshio; Yasumoto, Yoshio; Inoue, Shuji; Takai, Hitoshi: Matsumoto, Mitsujiro; Aono, Kouji; Uchimura, Kiyoshi; and Iwasaki, Eiji, 4,882,614, Cl. 358-12.000.
Yasumura, Gary: *See*—
Perry, Michael; and Yasumura, Gary, 4,881,908, Cl. 439-161.000.
Yasumura, Hiroto; Hirasawa, Masahide; Noji, Minoru; Kozuki, Susumu; Takahashi, Koji; and Yoshimura, Katsuji, to Canon Kabushiki Kaisha. Color video signal reproducing apparatus using frequency converted chrominance signal. 4,882,632, Cl. 358-330.000.
Yasutake, Kousuke, to Honda Giken Kogyo Kabushiki Kaisha. Crankshaft of internal combustion engine and method of producing the same. 4,881,427, Cl. 74-603.000.
Yates, Donald B.; and Przbylinski, Phillip G., to Trinity Industries, Inc. Gondola car having frameless radial truck. 4,881,470, Cl. 105-165.000.
Yato, Tadao; Onoue, Takeshi; and Tanaka, Hiroshi, to Mitsubishi Kinzoku Kabushiki Kaisha. Uo2 pellet fabrication process. 4,882,100, Cl. 264-0.500.
Yazaki Corporation: *See*—
Aoki, Yoshihito, 4,882,689, Cl. 364-449.000.
Yeda Research and Development Company Limited: *See*—
Vlodavsky, Israel; Eldor, Amiram; Naparstek, Yaakov; and Cohen, Irun R., 4,882,318, Cl. 514-56.000.
Yee, Raymond M. Sound reproduction system. 4,882,760, Cl. 381-90.000.
Yokohama Rubber Co., Ltd., The: *See*—
Kabe, Kazuyuki; Suzuki, Tatsuo; and Takahashi, Ken, 4,881,587, Cl. 152-534.000.
Kitami, Tetsu; and Mito, Jun, 4,881,576, Cl. 138-125.000.
Yokota, Seiji: *See*—
Koizumi, Tadashi; Yokota, Seiji; Matsumura, Shigeo; and Inoue, Yoshiaki, 4,881,722, Cl. 266-176.000.
Yokoyama, Shoji: *See*—
Nimura, Mitsuhiro; and Yokoyama, Shoji, 4,882,696, Cl. 364-449.000.
Yokoyama, Yoshimasa: *See*—
Koyama, Kazuya; and Yokoyama, Yoshimasa, 4,882,176, Cl. 426-5.000.
Yoneyama, Toshio: *See*—
Fukui, Hiroshi; Namba, Ryujiro; Saito, Tsutomu; Ohtsu, Yutaka; Kimura, Asa; Nakano, Motokiyo; Nakata, Okitsugu; Tommita, Kenichi; Tokubo, Kazuo; Ohno, Kazuhisa; Yoneyama, Toshio; Ogawa, Takashi; Morohoshi, Hideo; Koyama, Junichi; Kanda, Taketoshi; Kawaguchi, Kunihiro; and Shimizu, Yuzo, 4,882,225, Cl. 428-405.000.
Yonezawa, Yasuo; Matsushita, Masao; Oku, Kenzo; Nakano, Hiroki; Okumura, Shin-ichi; Yoshihara, Motoshi; Sakai, Akiyoshi; and Morikawa, Atsushi, to Nishiyodo Air Conditioner Co., Ltd. Adsorption refrigeration system. 4,881,376, Cl. 62-106.000.
Yoon, Hyun N.: *See*—
Leslie, Thomas M.; Yoon, Hyun N.; DeMartino, Ronald N.; and Stamatoff, James B., 4,882,402, Cl. 526-243.000.
Yopp, W. Trent, to Ford Motor Company. Automotive system for dynamically determining road adhesion. 4,882,693, Cl. 364-424.010.
Yoshida, Kuniaki: *See*—
Hirata, Toichi; Haga, Masakazu; Hirami, Ichiro; and Yoshida, Kuniaki, 4,881,450, Cl. 91-459.000.
Yoshida, Mitsuru: *See*—
Kawakubo, Takamasa; Yoshida, Mitsuru; and Suda, Yoshihisa, 4,882,102, Cl. 264-29.300.
Kawakubo, Takamasa; Yoshida, Mitsuru; and Suda, Yoshihisa, 4,882,103, Cl. 264-29.500.
Yoshida, Naoyuki; Kaneoya, Masakazu; and Uchida, Manabu, to Chisso Corporation. Optically active compounds and process for producing thereof. 4,882,451, Cl. 556-440.000.
Yoshida, Naoyuki: *See*—
Ohno, Kouji; Saito, Shinichi; Miyazawa, Kazutoshi; Ushioda, Makoto; Inoue, Hiromichi; and Yoshida, Naoyuki, 4,882,084, Cl. 252-299.660.
Yoshida, Ryo: *See*—
Nagano, Eiki; Hashimoto, Shunichi; Yoshida, Ryo; Matsumoto, Hiroshi; and Kamoshita, Katsuzo, 4,881,970, Cl. 71-96.000.
Yoshida, Shigemitsu: *See*—
Fujita, Toshio; Yamashita, Yoshisato; Yoshida, Shigemitsu; and Yamahira, Katsutoshi, 4,881,963, Cl. 71-64.070.
Yoshihara, Motoshi: *See*—
Yonezawa, Yasuo; Matsushita, Masao; Oku, Kenzo; Nakano, Hiroki; Okumura, Shin-ichi; Yoshihara, Motoshi; Sakai, Akiyoshi; and Morikawa, Atsushi, 4,881,376, Cl. 62-106.000.
Yoshii, Takashi; and Iinuma, Humitoshi, to Kubota Ltd. Transmission system for vehicle. 4,881,417, Cl. 74-15.840.
Yoshimura, Katsuji; Nakayama, Tadayoshi; Ishikawa, Hisashi; and Sato, Chikara, to Canon Kabushiki Kaisha. Video signal processing system. 4,882,615, Cl. 358-31.000.
Yoshimura, Katsuji: *See*—
Yasumura, Hiroto; Hirasawa, Masahide; Noji, Minoru; Kozuki, Susumu; Takahashi, Koji; and Yoshimura, Katsuji, 4,882,632, Cl. 358-330.000.
Yoshimura, Ryoichi: *See*—
Takasaki, Yoshimi; Yamaguchi, Akira; and Yoshimura, Ryoichi, 4,882,490, Cl. 250-236.000.
Yoshinaga, Kazuo; Katagiri, Kazuharu; Tsuboyama, Akira; Kitayama, Hiroyuki; Shinjo, Kenji; and Hioki, Chieko, to Canon Kabushiki Kaisha. Lactic acid derivative and liquid crystal composition containing same. 4,882,085, Cl. 252-299.610.
Yoshinaga, Kazuo: *See*—
Egara, Koichi; Mochizuki, Norihiro; Nakamura, Kenji; and Yoshinaga, Kazuo, 4,882,715, Cl. 367-140.000.
Yoshinaga, Yoko: *See*—
Yuasa, Satoshi; Munakata, Hirohide; Yoshinaga, Yoko; Haruta, Masahiro; and Nishimura, Yukuo, 4,881,798, Cl. 350-353.000.
Yoshino, Junichi: *See*—
Terai, Akio; Yoshino, Junichi; Satsumi, Shinroku; and Taniguchi, Mitsuru, 4,881,363, Cl. 56-255.000.
Yoshino, Masahito: *See*—
Hayakawa, Motomu; and Yoshino, Masahito, 4,882,717, Cl. 368-64.000.
Yoshino, Takehito: *See*—
Aoike, Tatsuyuki; Sano, Masafumi; Yoshino, Takehito; Kariya, Toshimitsu; and Niino, Hiroaki, 4,882,251, Cl. 430-57.000.
Yoshioka, Kouichi, to Takeda Chemical Industries, Ltd. Gamma-lactonecarboxylic acid derivatives and their use as antibacterial agents or intermediates. 4,882,434, Cl. 546-283.000.
Yoshioka, Shigehiko; Yamada, Hideto; Sato, Hisatake; and Kamei, Motokazu, to Seiko Kagaku Kogyo Co., Ltd.; Nippon Co., Ltd.; and Hokuetsu Paper Mills, Ltd. Aqueous dispersed solution of substituted succinic anhydride and process for producing the same. 4,882,087, Cl. 252-312.000.
Yoshioka, Takashi; and Doi, Akira, to Sumitomo Electric Industries, Ltd. Die for use in forming lens. 4,882,238, Cl. 428-698.000.
Yoshitomi Pharmaceutical Industries, Ltd.: *See*—
Murakami, Shu; Ikebe, Tsuguo; Hakamada, Ichiro; and Yaoka, Osamu, 4,882,326, Cl. 514-211.000.
Yoshizawa, Yoshihito; Yamauchi, Kiyotaka; and Oguma, Shigeru, to Hitachi Metals, Ltd. Fe-base soft magnetic alloy and method of producing same. 4,881,989, Cl. 148-302.000.
Young, David E.; and Davis, Kenneth P. Orthopaedic and orthotic bi-pivotal hinge with improved adjustment means. 4,881,299, Cl. 16-371.000.
Young, Ian R.; and Hall, Alasdair S., to Picker International, Ltd. Coil arrangements in magnetic resonance apparatus. 4,882,560, Cl. 335-299.000.
Young, William R., to Harris Corporation. Cell based ALU with tree structured carry, inverting logic and balanced loading. 4,882,698, Cl. 364-736.000.
Youngkeit, Dean C., to Morton Thiokol, Inc. Radiation gathering reflector and method of manufacture. 4,881,998, Cl. 156-173.000.
Yuasa, Satoshi; Munakata, Hirohide; Yoshinaga, Yoko; Haruta, Masahirc; and Nishimura, Yukuo, to Canon Kabushiki Kaisha. Thermal optical modulation method and device using alternating current. 4,881,798, Cl. 350-353.000.
Yugen Kaisha Shinjo Seisakusho: *See*—
Shinjo, Katsumi, 4,881,395, Cl. 72-90.000.
Yung-Mao, Lin, to Autry Industries, Inc. Custom midsole. 4,881,328, Cl. 36-28.000.
Zacharias, Clarence M.: *See*—
Rempel, Frank; Zacharias, Clarence M.; and Maxwell, Linden G., 4,881,855, Cl. 406-53.000.
Zahavi, Avi: *See*—
Anderl, Ewald C.; Frankel, Oren; and Zahavi, Avi, 4,882,474, Cl. 235-380.000.
Zahnradfabrik Friedrichshafen, AG.: *See*—
Liska, Georg, 4,881,877, Cl. 417-270.000.
Zaidlin, Mark M.: *See*—
Bocharov, Jury A.; Safonov, Anatoly V.; Nosov, Anatoly P.; Tamaris, Jury I.; Lunkov, Evgeny S.; Myakinenkov, Vladimir I.;

Perepechin, Igor Y.; Rudman, Leonid L.; Salov, Viktor P.; Bovykin, Igor V.; and Zaidlin, Mark M., 4,881,399, Cl. 72-454.000.

Zanoni, Carl A., to Zygo, Corporation. Linear and angular displacement measuring interferometer. 4,881,816, Cl. 356-349.000.

Zdunek, Kenneth J.: *See*—
Kotzin, Michael D.; Zdunek, Kenneth J.; and Ziolko, Eric F., 4,882,751, Cl. 380-9.000.

Zeeb, Rhinhold J. Motorized cradle. 4,881,285, Cl. 5-103.000.

Zehender, Jurgen, to Okoma Oberkochener Machinen GmbH. Woodworking machine. 4,881,583, Cl. 144-3.00R.

Zeidler, Falk: *See*—
Lutze, Hans; and Zeidler, Falk, 4,881,754, Cl. 280-728.000.

Zenbayashi, Katsuaki; Otsuga, Hisao; Morinaga, Akio; Toyoshima, Osamu; and Shimokawa, Shinji, to Tokyo Gas Kabushiki Kaisha; and Ashimori Kogyo Kabushiki Kaisha. Boring device for opening passages to branch portions of a lined main pipe line. 4,882,470, Cl. 219-523.000.

Zenbayashi, Michio: *See*—
Nagaoka, Hisayuki; and Zenbayashi, Michio, 4,882,396, Cl. 525-426.000.

Ziebach, Helmut; and Lange, Peter, to Fluhs Drehtechnik GmbH. Seal for valves. 4,881,570, Cl. 137-454.200.

Zinbarg, Benson: *See*—
Mimoun, Nancy; and Zinbarg, Benson, 4,881,651, Cl. 220-18.000.

Ziolko, Eric F.: *See*—
Kotzin, Michael D.; Zdunek, Kenneth J.; and Ziolko, Eric F., 4,882,751, Cl. 380-9.000.

Zoran Corporation: *See*—
Blech, Ilan A.; Gerzberg, Levy; Shacham, Yosef Y.; Sinar, Alexander; and Sirkin, Eric R., 4,882,611, Cl. 357-51.000.

Zuk, Borys, to Harris Semiconductor (Patents) Inc. Control of signal transmission. 4,882,749, Cl. 379-346.000.

Zvenyatsky, Boris: *See*—
Isaacs, Jack L.; and Zvenyatsky, Boris, 4,881,545, Cl. 227-178.000.

Zwieg, Grover A.: *See*—
Demler, Henry W., Jr.; Dols, Frank P.; Kimmel, David J.; Lauterbach, John H.; Sotolongo, Thomas J.; and Zwieg, Grover A., 4,881,905, Cl. 439-79.000.

Zygo, Corporation: *See*—
Sommargren, Gary E., 4,881,815, Cl. 356-349.000.
Zanoni, Carl A., 4,881,816, Cl. 356-349.000.

Zyma Sa: *See*—
Ventouras, Kimon, 4,882,169, Cl. 424-493.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 21ST DAY OF NOVEMBER, 1989

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Chiavon, Ezio R. Tamper-proof threaded fastenings. Re. 33,114, Cl. 81-121.100.

Hitachi, Ltd.: *See*—
Suzuki, Akira, Re. 33,116, Cl. 417-295.000.

Lewis, Julie M. Accouchement apparatus. Re. 33,115, Cl. 269-328.000.

Onda, Eiichi; and Watanabe, Masanori, to Seiko Koki Kabushiki Kaisha. Focal plane shutter for cameras. Re. 33,117, Cl. 354-246.000.

Seiko Koki Kabushiki Kaisha: *See*—
Onda, Eiichi; and Watanabe, Masanori, Re. 33,117, Cl. 354-246.000.

Suzuki, Akira, to Hitachi, Ltd. Single-stage oilless screw compressor system. Re. 33,116, Cl. 417-295.000.

Watanabe, Masanori: *See*—
Onda, Eiichi; and Watanabe, Masanori, Re. 33,117, Cl. 354-246.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Fuji Kagakushi Kogyo Co., Ltd.: *See*—
Seto, Tadao; and Shimazaki, Yoshikazu, B1 4,503,095, Cl. 427-265.000.

Seto, Tadao; and Shimazaki, Yoshikazu, to Fuji Kagakushi Kogyo Co., Ltd. Heat-sensitive color transfer recording media. B1 4,503,095, 11-21-89, Cl. 427-265.000.

Shimazaki, Yoshikazu: *See*—
Seto, Tadao; and Shimazaki, Yoshikazu, B1 4,503,095, Cl. 427-265.000.

LIST OF DESIGN PATENTEES

AG Communication Systems Corporation: *See*—
Barker, William C.; Desikan, Pathukotta; Fraser, Ross E.; Pflueger, Michael W.; and Sethia, Kamal S., 304,717, Cl. D14-241.000.
Barker, William C.; Desikan, Pathukotta K.; Fraser, Ross E.; Pflueger, Michael W.; and Sethia, Kamal S., 304,727, Cl. D14-241.000.

American Railroad Technology, Inc.: *See*—
Goss, Randall, 304,694, Cl. D10-114.000.

American Telephone and Telegraph Company: *See*—
Brooks, Richard R.; and Schaffeld, John H., 304,726, Cl. D14-149.000.

Aruman Kabushiki Kaisha: *See*—
Katayama, Yutaka, 304,771, Cl. D27-163.000.

Asahi, Sadaho, to Yoshida Kogyo K.K. Pull tab of slider for slide fastener. 304,702, 11-21-89, Cl. D11-221.000.

Ashe, Philip R.; Carey, James R.; Champagne, Patrick J.; and Rowden, David L., to Verbatim Corporation. Disk cartridge. 304,720, 11-21-89, Cl. D14-114.000.

Asner, Jerome L. Combined chip and salsa server. 304,659, 11-21-89, Cl. D7-3.000.

AT&T Bell Laboratories: *See*—
Brooks, Richard R.; and Schaffeld, John H., 304,726, Cl. D14-149.000.

Barker, William C.; Desikan, Pathukotta; Fraser, Ross E.; Pflueger, Michael W.; and Sethia, Kamal S., to AG Communication Systems Corporation. Base housing for a multi-feature telephone call processor. 304,717, 11-21-89, Cl. D14-241.000.

Barker, William C.; Desikan, Pathukotta K.; Fraser, Ross E.; Pflueger, Michael W.; and Sethia, Kamal S., to AG Communication Systems Corporation. Base housing for a multi-feature telephone call processor. 304,727, 11-21-89, Cl. D14-241.000.

Bates Manufacturing Company: *See*—
Leszczak, John; and Staubitz, Robert B., 304,734, Cl. D19-76.000.
Leszczak, John; and Staubitz, Robert B., 304,735, Cl. D19-76.000.

Bellandi, Edward A.: *See*—
Post, Steven W.; and Bellandi, Edward A., 304,757, Cl. D23-226.000.

Beuchat, Roland, to Synertrade and Finance S.A. Safety razor. 304,772, 11-21-89, Cl. D28-46.000.

Beuchat, Roland, to Synertrade and Finance S.A. Safety razor. 304,773, 11-21-89, Cl. D28-46.000.

Bowers, Michael. Hand held exerciser. 304,748, 11-21-89, Cl. D21-196.000.

Boyd, Bill E.: *See*—
Boyd, William D.; and Boyd, Bill E., 304,669, Cl. D8-22.000.

Boyd, William D.; and Boyd, Bill E. Adjustable wrench. 304,669, 11-21-89, Cl. D8-22.000.

Brooks, Richard R.; and Schaffeld, John H., to American Telephone and Telegraph Company; and AT&T Bell Laboratories. Telephone dialing apparatus. 304,726, 11-21-89, Cl. D14-149.000.

Bulgari, Paolo. Bracelet. 304,695, 11-21-89, Cl. D11-15.000.

Burrows, Bruce D. Water reservoir for a reverse osmosis system. 304,755, 11-21-89, Cl. D23-205.000.

Cal-Comp Electronics Inc.: *See*—
Leung, Chee-Chung, 304,719, Cl. D14-113.000.

Canon Kabushiki Kaisha: *See*—
Sugiyama, Yoshiaki; Tosaka, Yoichi; and Haraguchi, Shosuke, 304,729, Cl. D16-217.000.
Yoshihara Tsutomu, 304,723, Cl. D14-117.000.

Carey, James R.: *See*—
Ashe, Philip R.; Carey, James R.; Champagne, Patrick J.; and Rowden, David L., 304,720, Cl. D14-114.000.

Carlson, Arthur R. Container for bottles. 304,680, 11-21-89, Cl. D9-341.000.

Carlson, Bruce W.: *See*—
De brey, Robert J.; and Carlson, Bruce W., 304,770, Cl. D26-118.000.

Casio Computer Co., Ltd.: *See*—
Kubo, Tatsuya, 304,691, Cl. D10-15.000.
Miyahara, Akihiro, 304,730, Cl. D14-168.000.
Ohnumata, Yuichi, 304,731, Cl. D18-7.000.

Champagne, Patrick J.: *See*—
Ashe, Philip R.; Carey, James R.; Champagne, Patrick J.; and Rowden, David L., 304,720, Cl. D14-114.000.

Champion Spark Plug Company: *See*—
Hadtke, Frederick B., 304,684, Cl. D9-415.000.
Hadtke, Frederick B., 304,685, Cl. D9-415.000.

Cheung, Kwok K., to Chi Kuan Manufactory Limited. Lighted vanity mirror with hinged doors for attachment to the sun visor of an automobile. 304,712, 11-21-89, Cl. D12-191.000.

Chi Kuan Manufactory Limited: *See*—
Cheung, Kwok K., 304,712, Cl. D12-191.000.

Chromcraft Furniture Corp.: *See*—
Stafford, John R., 304,654, Cl. D6-502.000.

Clarke, Paul F. Clip-on automobile body side molding. 304,711, 11-21-89, Cl. D12-190.000.

Corella, Arthur P. Dual dispensing package with finger slots. 304,679, 11-21-89, Cl. D9-341.000.

Corrie, Alexander S. Fishing hand caster. 304,754, 11-21-89, Cl. D22-137.000.

Cowan, Murray L., to Textron Inc. Expansion bracelet. 304,696, 11-21-89, Cl. D11-25.000.

Crews, Timothy R. Flashing earing. 304,697, 11-21-89, Cl. D11-56.000.

Curtis, Bobby; and Terwilliger, Richard A., to Diasonics, Inc. Combined prostate and vaginal ultrasound probe. 304,760, 11-21-89, Cl. D24-17.000.

De'Armond, Robert, to Thomas Industries Inc. Light fixture or the like. 304,769, 11-21-89, Cl. D26-84.000.

De brey, Robert J. Lapel button. 304,699, 11-21-89, Cl. D11-99.000.

De brey, Robert J.; and Carlson, Bruce W., to De brey, Robert J. Decorative reflector for low-voltage, outdoor accent lights. 304,770, 11-21-89, Cl. D26-118.000.

Designer Bathware, Inc.: *See*—
Pool, Daniel L., 304,655, Cl. D6-323.000.

Desikan, Pathukotta: *See*—
Barker, William C.; Desikan, Pathukotta; Fraser, Ross E.; Pflueger, Michael W.; and Sethia, Kamal S., 304,717, Cl. D14-241.000.

Desikan, Pathukotta K.: *See*—
Barker, William C.; Desikan, Pathukotta K.; Fraser, Ross E.; Pflueger, Michael W.; and Sethia, Kamal S., 304,727, Cl. D14-241.000.

Diasonics, Inc.: *See*—
Curtis, Bobby; and Terwilliger, Richard A., 304,760, Cl. D24-17.000.

Dicola, Vince, to Thomas Industries Inc. Chandelier or the like. 304,768, 11-21-89, Cl. D26-84.000.

Dideriksen, Erling T., to Interlego A.G. Toy fence. 304,740, 11-21-89, Cl. D21-109.000.

Diekman, Norman J., to Stow & Davis Furniture Company. Desk. 304,653, 11-21-89, Cl. D6-428.000.

Di Gianni, John, to Sunola Food Corporation. Jug. 304,682, 11-21-89, Cl. D9-378.000.

Dixon, Gerald A. Collapsible cargo container. 304,689, 11-21-89, Cl. D9-424.000.

Du Bois Public Limited Company: *See*—
Fitton, Gerald; and Walker, Leonard, 304,750, Cl. D21-234.000.

Dunlap, Steven K.; and Jurczyk, Richard A., to I.O.O.H., Inc. Doll. 304,747, 11-21-89, Cl. D21-171.000.

Ebihara, Tooru: *See*—
Hashimoto, Kazunori; Kawakatsu, Yoshihiro; Ebihara, Tooru; Shimizu, Hideyasu; Tsunematsu, Shinichiro; and Takeda, Hirokazu, 304,722, Cl. D14-118.000.

Endo, Hiroshi: *See*—
Hashimoto, Kazunori; Saegusa, Masahito; Ohwada, Takashi; Kawakatsu, Yoshihiro; Ohuchi, Katsubumi; Endo, Hiroshi; and Yamashita, Kyoichi, 304,724, Cl. D14-118.000.

Endres, Paul: *See*—
Johnson, George E.; and Endres, Paul, 304,716, Cl. D13-25.000.

Environmental Fragrance Technologies, Ltd.: *See*—
Glucksman, Dov Z.; and Ratzlaff, Jorg, 304,758, Cl. D23-366.000.

Epoch Company, Ltd.: *See*—
Ukisu, Hiroshi, 304,739, Cl. D21-59.000.
Ukisu, Hiroshi, 304,741, Cl. D21-109.000.
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Glucksman, Dov Z.; and Ratzlaff, Jorg, to Environmental Fragrance Technologies, Ltd. Fragrance cartridge. 304,758, 11-21-89, Cl. D23-366.000.

Glynn, Michael H., to Sabre Safety Limited. Clamping band for a gas cylinder. 304,676, 11-21-89, Cl. D8-395.000.

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Hadtke, Frederick B., to Champion Spark Plug Company. Container. 304,685, 11-21-89, Cl. D9-415.000.

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662 4,881,943

CLASS 15

21 A 4,881,287
98 4,881,288
168 4,881,289
228 4,881,290
236.01 4,881,291

CLASS 16

2 4,881,292
86 A 4,881,293
114 R 4,881,294
4,881,295
237 4,881,296
258 4,881,297
266 4,881,298
371 4,881,299

CLASS 17

32 4,881,300

CLASS 24

30.5 R 4,881,301
136 R 4,881,302
170 4,881,303
511 4,881,304
616 4,881,305

CLASS 27

12 4,881,306

CLASS 29

6.1 4,881,307
25.42 4,881,308
27 A 4,881,309
122 4,881,310
157.3 A 4,881,311
157.3 C 4,881,312
163.8 4,881,313
421.2 4,881,314
450 4,881,315
510 4,881,316
623.5 4,881,944
739 4,881,317
827 4,881,318
840 4,881,319
841 4,881,320
861 4,881,321
878 4,881,322

CLASS 30

41 4,881,323

CLASS 33

555.1 4,881,324

CLASS 34

60 4,881,325
92 4,881,326
114 4,881,327

CLASS 36

28 4,881,328
38 4,881,329
117 4,881,330

CLASS 37

142 A 4,881,331
285 4,881,332

CLASS 40

152.1 4,881,333
322 4,881,836
365 4,881,334
449 4,881,335
530 4,881,336

CLASS 42

42.06 4,881,340

CLASS 43

4 4,881,337
5 4,881,338
42.04 4,881,339
42.12 4,881,341

CLASS 44

72 4,881,945
627 4,881,946

CLASS 47

47 4,881,342
57.6 4,881,343
77 4,881,344

CLASS 48

89 4,881,947
192 4,881,948
197 R 4,881,949

CLASS 49

385 4,881,345
501 4,881,346

CLASS 51

5 R 4,881,347
307 4,881,950
309 4,881,951

CLASS 52

127.11 4,881,349
127.7 4,881,348
167 R 4,881,350
182 4,881,351
239 4,881,352
4,881,353
665 4,881,354
738 4,881,355

CLASS 53

53 4,881,356
64 4,881,357
399 4,881,358
427 4,881,359
439 4,881,360

CLASS 55

1 4,881,952
16 4,881,953
4,881,954
4,881,955
84 4,881,956
97 4,881,957
179 4,881,958
267 4,881,959

CLASS 56

17.5 4,881,361
202 4,881,362
255 4,881,363
314 4,881,364

CLASS 59

7 4,881,365

CLASS 60

39.07 4,881,366
4,881,367
274 4,881,368
285 4,881,369
310 4,881,370
431 4,881,371
521 4,881,372
732 4,881,373

CLASS 62

20 4,881,960
50.6 4,881,374
4,881,375
106 4,881,376
292 4,881,961
320 4,881,377
348 4,881,378
380 4,881,379
389 4,881,380

CLASS 65

104 4,881,962

CLASS 66

1 A 4,881,381
126 R 4,881,382
194 4,881,383

CLASS 68

27 4,881,384
29 4,881,385

CLASS 70

19 4,881,386
39 4,881,387
175 4,881,388
209 4,881,389
219 4,881,390
455 4,881,391

CLASS 71

64.07 4,881,963
91 4,881,964
92 4,881,965
4,881,967
4,881,968
94 4,881,966
4,881,969
96 4,881,970

CLASS 72

7 4,881,392
27 4,881,393
45 4,881,394
90 4,881,395
247 4,881,396
361 4,881,397
419 4,881,398
454 4,881,399

CLASS 73

35 4,881,400
4,881,401
61 R 4,881,402
115 4,881,403
119 A 4,881,404
146 4,881,405
154 4,881,406
204.16 4,881,407
517 AV 4,881,408
597 4,881,409
724 4,881,410
856 4,881,411
861.04 4,881,412
861.12 4,881,413
862.33 4,881,414
865.8 4,881,415

CLASS 74

7 A 4,881,416
15.84 4,881,417
89.14 4,881,418
89.15 4,881,419
109 4,881,420
412 TA 4,881,421
440 4,881,422
501.6 4,881,423
523 4,881,424
538 4,881,425
574 4,881,426
603 4,881,427
859 4,881,428
867 4,881,429

CLASS 75

78 4,881,971
93 G 4,881,972
118 P 4,881,973

CLASS 76

104 R 4,881,430
108 R 4,881,431

CLASS 81

3.36 4,881,432
55 4,881,433
121.1 Re.33,114
426 4,881,434
469 4,881,435

CLASS 83

342 4,881,436
477.2 4,881,437
840 4,881,438
879 4,881,439

CLASS 84

291 4,881,441
403 4,881,442
473 4,881,443
609 4,881,440

CLASS 87

8 4,881,444

CLASS 89

1.15 4,881,445
8 4,881,446
34 4,881,447
36.02 4,881,448

CLASS 91

372 4,881,449
459 4,881,450

CLASS 92

48 4,881,451
4,881,452
4,881,453
84 4,881,454
88 4,881,455
248

CLASS 98

2.01 4,881,456

CLASS 99

323.5 4,881,457
533 4,881,458

CLASS 100

95 4,881,459

CLASS 101

91 4,881,460
235 4,881,461
292 4,881,462

CLASS 102

202.2 4,881,463
336 4,881,464
501 4,881,465
522 4,881,466

CLASS 104

7.2 4,881,467
103 4,881,468
138.1 4,881,469

CLASS 105

165 4,881,470

CLASS 106

1.14 4,881,974
14.05 4,881,975
15.05 4,881,976
22 4,881,977
495 4,881,980

CLASS 108

144 4,881,471

CLASS 110

186 4,881,472
244 4,881,473
263 4,881,474
346 4,881,475
347 4,881,476

CLASS 112

121.15 4,881,477
259 4,881,478
262.3 4,881,479

CLASS 114

103 4,881,480
204 4,881,481
256 4,881,482
294 4,881,483
361 4,881,484

CLASS 116

28 R 4,881,485
227 4,881,486
4,881,487

CLASS 118

320 4,881,488
672 4,881,489

CLASS 119

1 4,881,490
51.01 4,881,491
106 4,881,492

CLASS 122

13 A 4,881,493

CLASS 123

41.12 4,881,494
41.31 4,881,495
90.33 4,881,496
90.34 4,881,497
90.39 4,881,498
90.52 4,881,499
188 AA 4,881,500
279 4,881,501
399 4,881,502
400 4,881,503
447 4,881,504
480 4,881,505
503 4,881,506
523 4,881,507
549 4,881,508
571 4,881,509
572 4,881,510
4,881,511
628 4,881,512
664 4,881,513

CLASS 124

23 R 4,881,514
24 R 4,881,515
35 A 4,881,516
65 4,881,517

CLASS 125

14 4,881,518

CLASS 126

21 A 4,881,519
44 4,881,520
438 4,881,521
540 4,881,522

CLASS 128

4 4,881,523
6 4,881,524
20 4,881,525
24.5 4,881,526
30.2 4,881,527
75 4,881,528
4,881,529
79 4,881,530
4,881,531
80 A 4,881,532
87 R 4,881,533
201.15 4,881,538
201.27 4,881,539
202.28 4,881,540
203.25 4,881,541
207.14 4,881,542
303.1 4,881,543
335 4,881,546
344 4,881,547
376 4,881,548
660.07 4,881,549
752 4,881,550
754 4,881,551
774 4,881,552
844 4,881,553

CLASS 131

335 4,881,555
359 4,881,556
365 4,881,557

CLASS 132

112 4,881,558
226 4,881,559
324 4,881,560

CLASS 134

16 4,881,978
76 4,881,561
110 4,881,562
166 C 4,881,563

CLASS 135

82 4,881,564
101 4,881,565

CLASS 136

201 4,881,979

CLASS 137

13 4,881,566
203 4,881,567
268 4,881,568
270 4,881,554
360 4,881,569
454.2 4,881,570
488 4,881,571
4,881,572
614.04 4,881,573
624.13 4,881,574
889 4,881,575

CLASS 138

125 4,881,576

CLASS 140

71 R 4,881,577

CLASS 141

44 4,881,578
86 4,881,579
98 4,881,580
113 4,881,581

CLASS 144

3 D 4,881,582
3 R 4,881,583
39 4,881,584
134 A 4,881,585

CLASS 148

11.5 R 4,881,981
12 B 4,881,987
16.5 4,881,982
16.6 4,881,983
101 4,881,984
103 4,881,985
4,881,986
300 4,881,988
302 4,881,989
320 4,881,990
325 4,881,991
421 4,881,992

CLASS 149

46 4,881,993
109.4 4,881,994

CLASS 152

209 B 4,881,586
534 4,881,587

CLASS 156

52 4,881,995
66 4,881,997
157 4,881,996
173 4,881,998
231 4,881,999
239 4,882,000
273.3 4,882,001
310 4,882,002
315 4,882,003
381 4,882,004
470 4,882,005
504 4,882,006
523 4,882,007
643 4,882,008

CLASS 159

4.2 4,882,009

CLASS 160

345 4,881,588

CLASS 162

30.1 4,882,010
368 4,882,011

CLASS 164

491 4,881,589

CLASS 165

26 4,881,591
48.1 4,881,590
104.16 4,881,592
104.29 4,881,593
173 4,881,594
4,881,595
174 4,881,596

CLASS 166

92 4,881,597
250 4,881,598

284 4,881,599

CLASS 168

11 4,881,600

CLASS 169

53 4,881,601

CLASS 172

22 4,881,602
311 4,881,603

CLASS 173

11 4,881,604

CLASS 174

48 4,882,453
68.5 4,882,454
4,882,455

CLASS 175

320 4,881,605

CLASS 177

126 4,881,606
256 4,881,607

CLASS 178

18 4,881,608

CLASS 180

9.5 4,881,609
68.2 4,881,610
79.1 4,881,611
132 4,881,612
140 4,881,613
225 4,881,614
287 4,881,615

CLASS 181

129 4,881,616
164 4,881,617
176 4,881,618

CLASS 182

77 4,881,619
179 4,881,620

CLASS 185

39 4,881,621

CLASS 188

65.1 4,881,622
73.38 4,881,623
82.2 4,881,624
290 4,881,625

CLASS 192

0.076 4,881,627
60 4,881,626
85 AA 4,881,628
98 4,881,629

CLASS 194

203 4,881,630
228 4,881,631
350 4,881,632

CLASS 198

345 4,881,633
372 4,881,634
460 4,881,635

CLASS 200

43.15 4,882,456
52 R 4,882,458
61.54 4,882,457
83 J 4,882,459
512 4,882,460
536 4,882,461

CLASS 202

176 4,882,012

CLASS 204

1 T 4,882,013
1.5 4,882,014
11 4,882,015
15 4,882,016
71 4,882,017
105 R 4,882,018
129.1 4,882,019
157.15 4,882,021
157.3 4,882,020
192.15 4,882,022
192.31 4,882,023
242 4,882,024
252 4,882,025
275 4,882,026
286 4,882,027
298 4,882,028
400 4,882,029
406 4,882,030
415 4,882,031
422 4,882,032
425 4,882,033

CLASS 206

37.1 4,881,636
278 4,881,637
313 4,881,640
315.3 4,881,638
320 4,881,641
328 4,881,639
4,881,642
343 4,881,643
363 4,881,644
387 4,881,645
460 4,881,646
510 4,881,647
540 4,881,648
634 4,881,649

CLASS 208

15 4,882,034
45 4,882,035
50 4,882,036
85 4,882,037
111 4,882,038
120 4,882,039
138 4,882,040
177 4,882,041

CLASS 209

138 4,882,042
212 4,882,043
319 4,882,044

CLASS 210

86 4,882,045
195.3 4,882,046
198.2 4,882,047
4,882,048
225 4,882,049
231 4,882,050
248 4,882,051
282 4,882,052
293 4,882,053
389 4,882,054
483 4,882,055
490 4,882,056
500.23 4,882,057
601 4,882,058
606 4,882,059
646 4,882,060
652 4,882,061
656 4,882,062
659 4,882,063
667 4,882,064
674 4,882,065
679 4,882,066
688 4,882,067
703 4,882,068
713 4,882,069
727 4,882,070
747 4,882,071
752 4,882,072
776 4,882,073

CLASS 219

10.55 B 4,882,462
10.55 E 4,882,463
69.13 4,882,464
121.48 4,882,465
219 4,882,466
4,882,467
400 4,882,468
421 4,882,469
523 4,882,470

CLASS 220

1 C 4,881,650
18 4,881,651
20 4,881,652
22.3 4,881,653
85 H 4,881,654
209 4,881,655
270 4,881,656
303 4,881,657
306 4,881,658
319 4,881,659

CLASS 221

44 4,881,660

CLASS 222

67 4,881,661
81 4,881,662
132 4,881,663
153 4,881,664
181 4,881,665
386.5 4,881,666
437 4,881,667
482 4,881,668
505 4,881,669
590 4,881,670

CLASS 224

222 4,881,671
264 4,881,672
311 4,881,673
4,881,674

CLASS 225

43 4,881,675

CLASS 227

63 4,881,676
178 4,881,544
4,881,545

CLASS 228

33 4,881,677
102 4,881,678
132 4,881,679
182 4,881,680
198 4,881,681
242 4,881,682

CLASS 229

87 A 4,881,684
115 4,881,685
117.01 4,881,683

CLASS 235

1 D 4,882,471
88 R 4,882,472
380 4,882,473
4,882,474
383 4,882,475
462 4,882,476
488 4,882,477

CLASS 236

46 R 4,881,686

CLASS 239

332 4,881,687
691 4,881,688

CLASS 241

9 4,881,689
82.3 4,881,690
101.5 4,881,691
167 4,881,692

CLASS 242

35.5 A 4,881,693
43 R 4,881,694
58.4 4,881,695
199 4,881,696
248 4,881,699
254 4,881,697
256 4,881,698

CLASS 244

2 4,881,700
49 4,881,701
118.6 4,881,702
213 4,881,703
4,881,704

CLASS 248

74.2 4,881,705
99 4,881,706
221.4 4,881,707
243 4,881,708
281.1 4,881,709
311.2 4,881,710
362 4,881,711
562 4,881,712

CLASS 249

54 4,881,713
60 4,881,714
165 4,881,715
192 4,881,716

CLASS 250

211 R 4,882,478
213 VT 4,882,480
4,882,481
214 A 4,882,482
231 SE 4,882,479
236 4,882,483
4,882,490
282 4,882,484
288 4,882,485
305 4,882,486
306 4,882,487
327.2 4,882,488
4,882,489
338.1 4,882,598
338.3 4,882,491
346 4,882,492
353 4,882,493
363.09 4,882,494
4,882,495
455.1 4,882,496
560 4,882,497
571 4,882,498
577 4,882,499

CLASS 251

144 4,881,717
209 4,881,718
328 4,881,719

CLASS 252

8.553 4,882,075
8.8 4,882,074
4,882,076
49.5 4,882,077
62.9 4,882,079
117 4,882,080
299.61 4,882,082
4,882,083
4,882,085
4,882,086
299.66 4,882,084
312 4,882,087
313.1 4,882,088
511 4,882,090
527 4,882,091
628 4,882,092
629 4,882,078
632 4,882,093
633 4,882,094

CLASS 254

358 4,881,720

CLASS 256

52 4,881,721

CLASS 261

30 4,882,096
35 4,882,097
93 4,882,098
128 4,882,099

CLASS 264

0.5 4,882,100
26 4,882,101
29.3 4,882,102
29.5 4,882,103
40.1 4,882,104
4,882,105
41 4,882,106
51 4,882,107
54 4,882,108
62 4,882,109
63 4,882,110
87 4,882,111
109 4,882,112
127 4,882,113
129 4,882,114
254 4,882,116
328.9 4,882,117
510 4,882,118
526 4,882,119

CLASS 266

176 4,881,722

CLASS 267

64.12 4,881,723
64.23 4,881,724
179 4,881,725

CLASS 269

41 4,881,726
309 4,881,727
328 Re.33,115
4,881,728

CLASS 271

3.1 4,881,729
296 4,881,730
315 4,881,731

CLASS 272

73 4,881,732

CLASS 273

1 R 4,881,733
1.5 R 4,881,734
25 4,881,735
26 B 4,881,736
80 A 4,881,737
153 S 4,881,738
164 4,881,739
248 4,881,740
327 4,881,741
376 4,881,744
413 4,881,742
418 4,881,743

CLASS 279

4 4,881,745

CLASS 280

33.992 4,881,746
81.6 4,881,747
91 4,881,748
95.1 4,881,749
276 4,881,750
457 4,881,751
690 4,881,752
707 4,881,753
728 4,881,754
779 4,881,755
785 4,881,756
804 4,881,757

CLASS 283

102 4,881,758

CLASS 285

49 4,881,759
93 4,881,760
239 4,881,761
367 4,881,762
382 4,881,763

CLASS 292

13 4,881,764
92 4,881,765
182.28 4,882,081
201 4,881,766
224 4,881,767
251 4,881,768

CLASS 294

15 4,881,769
64.1 4,881,770
151 4,881,771

CLASS 296

180.1 4,881,772
216 4,881,773

CLASS 297

341 4,881,774
361 4,881,775
379 4,881,776
406 4,881,777
417 4,881,778
442 4,881,779
467 4,881,780
473 4,881,781

CLASS 298

7 4,881,782

CLASS 301

37 S 4,881,783

CLASS 303

100 4,881,784
111 4,881,785

CLASS 305

10 4,881,786

CLASS 307

11 4,882,501
247.1 4,882,502
256 4,882,504
267 4,882,503
269 4,882,505
296.1 4,882,506
443 4,882,507

CLASS 310

13 4,882,508
46 4,882,509
63 4,882,510
67 R 4,882,511
90.5 4,882,512
114 4,882,513
208 4,882,514
263 4,882,515
316 4,882,525
323 4,882,500

CLASS 312

42 4,881,787

CLASS 313

407 4,882,516
440 4,882,521
502 4,882,517
512 4,882,518
633 4,882,519
643 4,882,520

CLASS 315

119 4,882,522

CLASS 318

254 4,882,523
4,882,524
561 4,882,526
568.13 4,882,527
600 4,882,528
602 4,882,529
696 4,882,530

CLASS 322

60 4,882,531

CLASS 323

222 4,882,532
313 4,882,533
351 4,882,534

CLASS 324

61 R 4,882,536
65 R 4,882,537
127 4,882,538
229 4,882,539
318 4,882,540
322 4,882,541
368 4,882,542
460 4,882,543
511 4,882,544
585 C 4,882,535

CLASS 328

138 4,882,545

CLASS 329

310 4,882,546

CLASS 330

149 4,882,547
288 4,882,548

CLASS 331

14 4,882,549
49 4,882,550
78 4,882,551

CLASS 332

100 4,882,552

CLASS 333

26 4,882,553
105 4,882,554
116 4,882,555

CLASS 335

8 4,882,556
9 4,882,557
260 4,882,558
284 4,882,559
299 4,882,560

CLASS 336

65 4,882,561

CLASS 338

28 4,882,571

CLASS 340

388 4,882,562
426 4,882,563
449 4,882,564
456 4,882,572
461 4,882,565
522 4,882,567
568 4,882,568
572 4,882,569
574 4,882,570
578 4,882,573
581 4,882,574
608 4,882,575
632 4,882,576
739 4,882,577
750 4,882,578
825.44 4,882,579
825.51 4,882,580
825.690 4,882,566

CLASS 341

22 4,882,581
23 4,882,582
59 4,882,583
139 4,882,584
143 4,882,585
169 4,882,586

CLASS 342

372 4,882,587
373 4,882,588
374 4,882,589
453 4,882,590

CLASS 343

715 4,882,591
4,882,592

CLASS 346

108 4,882,594
111 4,882,593
140 R 4,882,595
4,882,596
4,882,597

CLASS 350

96.15 4,881,788
4,881,789
96.16 4,881,790
96.19 4,881,791
96.20 4,881,792
96.21 4,881,793
96.23 4,881,794
4,881,795
166 4,881,796
339 F 4,881,797
353 4,881,798
429 4,881,799
500 4,881,800
503 4,881,801
525 4,881,802

CLASS 351

156 4,881,803
161 4,881,804
4,881,805
204 4,881,806
208 4,881,807
221 4,881,808

CLASS 353

60 4,882,599

CLASS 354
64 4,882,600
246 Re.33,117
407 4,882,601
457 4,882,602

CLASS 355
75 4,882,603
201 4,882,604
215 4,882,605
274 4,882,606

CLASS 356
5 4,881,809
241 4,881,810
323 4,881,811
344 4,881,812
345 4,881,813
346 4,881,814
349 4,881,815
4,881,816
350 4,881,817
367 4,881,818

CLASS 357
19 4,882,607
22 4,882,608
4,882,609
23.13 4,882,610
51 4,882,611
79 4,882,612

CLASS 358
12 4,882,614
31 4,882,615
37 4,882,613
44 4,882,616
55 4,882,619
60 4,882,617
75 4,882,620
80 4,882,621
4,882,622
98 4,882,623
140 4,882,625
153 4,882,624
166 4,882,626
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	4,881,464	4,881,789	4,882,585	4,882,061	4,882,700	4,882,472
	4,881,470	4,881,796	4,882,587	4,882,080	17 : 4,881,283	4,882,493
	4,881,721	4,881,801	4,882,588	4,882,168	4,881,311	4,882,548
	4,881,881	4,881,808	4,882,589	4,882,194	4,881,317	4,882,566
	4,882,222	4,881,815	4,882,590	4,882,212	4,881,322	4,882,626
02 :	4,881,672	4,881,817	4,882,591	4,882,273	4,881,323	4,882,659
04 :	4,881,341	4,881,841	4,882,611	4,882,385	4,881,346	19 : 4,881,573
	4,881,637	4,881,845	4,882,629	10 : 4,881,644	4,881,380	4,881,600
	4,881,679	4,881,858	4,882,656	4,881,684	4,881,503	4,882,128
	4,881,736	4,881,862	4,882,657	4,881,967	4,881,515	4,882,475
	4,881,929	4,881,868	4,882,667	4,881,968	4,881,571	4,882,476
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	4,882,512	4,881,908	4,882,678	4,882,401	4,881,604	4,881,537
	4,882,583	4,881,910	4,882,709	4,882,636	4,881,609	4,881,603
	4,882,646	4,881,928	4,882,733	12 : 4,881,291	4,881,668	4,881,849
	4,882,760	4,881,945	4,882,734	4,881,338	4,881,715	4,882,141
05 :	4,881,631	4,881,956	4,882,747	4,881,484	4,881,733	21 : 4,881,641
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	4,881,295	4,882,014	4,882,763	4,881,657	4,881,896	4,882,066
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	4,881,533	4,882,193	4,882,262	4,882,648	4,882,387	4,881,741
	4,881,535	4,882,195	4,882,642	4,882,658	4,882,469	4,881,939
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	4,881,728	4,882,540	4,881,814	4,882,230	4,881,912	4,881,954
	4,881,735	4,882,551	4,881,816	15 : 4,882,770	4,881,990	4,881,955
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DESIGN PATENTS

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